

VOLUME 194

NUMBER 3, PART 3

THE ASTROPHYSICAL JOURNAL

1974

ANNUAL AUTHOR AND SUBJECT INDEX

TO VOLUMES 187-194 PARTS 1 AND 2
AND
TO THE SUPPLEMENT SERIES
VOLUMES 27 AND 28

Compiled by Lois Newman

PUBLISHED BY THE UNIVERSITY OF CHICAGO PRESS FOR
THE AMERICAN ASTRONOMICAL SOCIETY

\$5.00

VOLUME 194

NUMBER 3, PART 3

THE ASTROPHYSICAL JOURNAL

1974

ANNUAL AUTHOR AND SUBJECT INDEX

TO VOLUMES 187-194 PARTS 1 AND 2

AND

TO THE SUPPLEMENT SERIES

VOLUMES 27 AND 28

Compiled by Lois Newman

PUBLISHED BY THE UNIVERSITY OF CHICAGO PRESS FOR
THE AMERICAN ASTRONOMICAL SOCIETY



CONTENTS

	<i>Page</i>	<i>Fiche</i>
AUTHOR INDEX	1	1-A5
SUBJECT HEADINGS	43	1-E1
SUBJECT INDEX	45	1-E3

© 1975 by The American Astronomical Society. All rights reserved.
Printed in U.S.A.

1974 ANNUAL INDEX

AUTHOR INDEX

- Aaronson, Marc, Black, John Harry, and McKee, Christopher F. A Search for Molecular Hydrogen in Quasar Absorption Spectra, **191**, L53, 46-A10.
- Aarseth, Sverre J. See Saslaw et al., The Gravitational Slingshot and the Structure of Extragalactic Radio Sources, **190**, 253, 31-A13.
- Abt, Helmut A. Catalog of Individual Radial Velocities, **12^h-24^h**, Measured by Astronomers of the Mount Wilson Observatory, **187**, 421, 6-A3; Suppl. **26**, 365 (No. 234).
- Abt, Helmut A. See Joy and Abt, Spectral Types of M Dwarf Stars, **192**, 237, 52-C1; Suppl. **28**, 1 (No. 252).
- Abt, Helmut A., and Levy, Saul G. Period Variation of the Cepheid Zeta Geminorum, **188**, L75, 15-F11.
- Abt, Helmut A., and Levy, Saul G. Reinvestigation of Certain Long-Period A-Type Binaries, **188**, 291, 13-F13.
- Acton, L. W. See Catura et al., The Extended X-Ray Source in Virgo and its Relation to M87, **190**, 521, 35-B1.
- Acquista, C., and Anderson, J. L. Radiative Transfer of Partially Polarized Light, **191**, 567, 45-F2.
- Adams, J. H., Jr. See Golden et al., Rigidity Spectrum of $Z \geq 3$ Cosmic-Ray Nuclei in the Range 4 to 285 GV and a Search for Cosmic Antimatter, **192**, 747, 60-F3.
- Adams, Richard C., Cohen, Jeffrey M., Adler, Ronald J., and Sheffield, Charles. Analytic Pulsar Models, **192**, 525, 57-A1.
- Adams, Thomas F. Variable N Galaxies as Composite Systems, **188**, 463, 16-B7.
- Adams, W. M., and Petrosian, Vahé. Effect of Inelastic Electron-Atom Collisions on the Balmer Decrement, **192**, 199, 51-G8.
- Ade, P. A. R. See Phillips et al., Large-Scale Wave Structure in the Orion Molecular Cloud, **191**, L31, 42-C5.
- Ade, P. A. R., Rather, J. D. G., and Clegg, P. E. Limits to Solar Limb Darkening at a Wavelength of 1.4 Millimeters Derived from Antenna-Beam Parameters, **187**, 389, 5-E13.
- Ade, Peter A. R., Clegg, Peter E., and Rather, John D. G. 1-Millimeter Observations of the Galactic H II Regions M42 and DR 21, **189**, L23, 21-A7.
- Adelman, Saul J. The Peculiar A Star HD 200311: A Photographic-Region Line-Identification Study, **192**, 573, 57-D5; Suppl. **28**, 51 (No. 254).
- Adelman, Saul J. The Peculiar A Star HD 215441, **190**, 743, 37-E1; Suppl. **27**, 203 (No. 242).
- Adelman, Saul J. Selected Line Identifications in the Ultraviolet Spectrum of Gamma Equulei, **190**, 743, 37-E1; Suppl. **27**, 183 (No. 242).
- Adelman, Saul J. See Hartog et al., On the Abundance of Europium, **187**, 551, 8-C1.
- Adelman, Saul J. See Shore and Adelman, Magnetic Fields and Diffusion Processes in Peculiar A Stars, **191**, 165, 40-E11.
- Adler, I. See Trombka et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. II. X-Ray Time Profile and Source Location, **194**, L27, 76-E2.
- Adler, Ronald J. See Adams et al., Analytic Pulsar Models, **192**, 525, 57-A1.
- Aggarwal, H. R., and Oberbeck, V. R. Roche Limit of a Solid Body, **191**, 577, 45-F12.
- Agrawal, P. C. See Moore et al., An Upper Limit on Soft X-Ray Pulsations from the Pulsar SPR 0833-45, **189**, L117, 27-D4.
- Ahmad, Afaf, and Cohen, Leon. Dynamical Friction in Gravitational Systems, **188**, 469, 16-B13.
- Ahmad, I. A. Effects of a Free-free Radio Continuum on the Populations of High Atomic Levels at Low Temperatures and Densities, **194**, 503, 80-B5.
- Aikin, A. C. Cometary Coma Ions, **193**, 263, 65-E7.
- Aime, Claude. See Fossat et al., Evidence for Large-Scale Oscillations of the Solar Photosphere, **193**, L97, 69-E13.
- Aizenman, M. L., and Cox, J. P. Pulsational Stability of Stars in Thermal Imbalance. IV. Direct Solution of Differential Equation, **194**, 663, 83-C7.
- Aizenman, Morris L. See Cox et al., Pulsational Stability of Stars in Thermal Imbalance. III. Analysis in Terms of Absolute Variations, **191**, 439, 44-D9.
- Akabane, K. See Kaifu et al., Detection of Interstellar Methylamine, **191**, L135, 49-C5.
- Albers, Henry. Spectral Classification from Infrared Spectra of Moderate Dispersion, **189**, 463, 25-F1.
- Albert, Elise, and Huang, Su-Shu. Profiles of Emission Lines in Be Stars. III. Further Study of the Long-Period V/R Variation, **189**, 479, 25-G5.
- Alexander, David R. See Fix and Alexander, Solid Particles and Stellar Mass Loss, **188**, L91, 18-D3.
- Allen, Marc S., and Cowley, Charles R. Resolution of the Praseodymium Abundance Anomaly in the Ba II Stars, **190**, 601, 36-A7.
- Allen, Mark, Cesarsky, Diego A., and Crutcher, Richard M. A Search for OD in the Galactic Center, **188**, 33, 10-C5.
- Aller, H. D. See Dent et al., The Evolution of the Radio Spectrum of Cassiopeia A, **188**, L11, 12-C12.
- Aller, L. H. See Boeshaar et al., Spectrophotometric Observations of NGC 6543, **193**, 290, 65-C6; Suppl. **28**, 335 (No. 264).
- Aller, L. H. See Czyzak et al., Forbidden-Line Excitation Data for Certain Coronal Lines, **195**, 251, 3-D6; Suppl. **28**, 465 (No. 272).
- Aller, L. H. See Lee et al., Spectrophotometric Studies of Gaseous Nebulae. XXIII. The Planetary Nebula NGC 6803, **192**, 159, 51-D10.
- Alme, Marvin L., and Wilson, James R. Numerical Study of X-Ray Induced Mass Transfer in the HZ Herculis/Hercules X-1 Binary System, **194**, 147, 75-E1.
- Altrock, Richard C., and Canfield, Richard C. Analysis of the Solar Magnesium I Spectrum, **194**, 733, 84-A3.
- Anders, Edward, Hayatsu, Ryoichi, and Studier, Martin H. Interstellar Molecules: Origin by Catalytic Reactions on Grain Surfaces?, **192**, L101, 58-A5.
- Anderson, Christopher M. Observations of the Profile of the Ca II Infrared Triplet Line $\lambda\lambda 8498$ in Late-Type Stars, **190**, 585, 35-G6.
- Anderson, J. D., Hubbard, W. B., and Slattery, W. L. Structure of the Jovian Envelope from *Pioneer 10* Gravity Data, **193**, L149, 73-B3.
- Anderson, J. L. See Acquista and Anderson, Radiative Transfer of Partially Polarized Light, **191**, 567, 45-F2.
- Anderson, Kurt S. On the Nuclear Motions in NGC 4151, **187**, 445, 7-B10.

- Anderson, Kurt S. See Langer et al., FG Sagittae: The *s*-Process Episodile, **189**, 509, 26-B5.
- Anderson, Kurt S. See Langer et al., F Sagittae: The *s*-Process Episode, **189**, 509, 26-B5.
- Andrew, B. H., Ehrman, J. R., Gearhart, M. R., and Kraus, J. D. Spectra of Some Ohio Radio Sources: List IV (Erratum), **189**, 165, 20-E12.
- Andrew, B. H., Harvey, G. A., Medd, W. J., Hackney, K. R., Hackney, R. L., Scott, R. L., Smith, A. G., Leacock, R. J., McGimsey, B. Q., Epstein, E. E., Montgomery, J. W., Mottman, J., and Pompfrey, R. B. BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, **191**, 51, 39-E1.
- Angel, J. R. P. See Landstreet and Angel, The Wavelength Dependence of Circular Polarization in GD 229, **190**, L25, 30-F1.
- Angel, J. R. P. See Martin and Angel, A Study of Birefringence in the Interstellar Medium in the Direction of the Crab Nebula, **193**, 343, 67-D9.
- Angel, J. R. P. See Martin and Angel, A Study of Interstellar Polarization at the $\lambda\lambda$ 4430 and 5780 Features in HD 183143, **188**, 517, 16-F4.
- Angel, J. R. P. See Woodgate et al., Detection of the [Fe XIV] Coronal Line at 5303 Å in the Cygnus Loop, **188**, L79, 18-C6.
- Angel, J. R. P., Carswell, R. F., Stritmatter, P. A., Beaver, E. A., and Harms, R. Discovery of a Magnetic DA White Dwarf, **194**, L47, 76-F6.
- Angel, J. R. P., Hintzen, P., Stritmatter, P. A., and Martin, P. G. G240-72: A New Magnetic White Dwarf with Unusual Polarization, **190**, L71, 33-G9.
- Angel, J. R. P., and Landstreet, J. D. A Determination by the Zeeman Effect of the Magnetic Field Strength in the White Dwarf G99-37, **191**, 457, 44-E12.
- Anile, A., Marcello, and Breuer, Reinhard A. Gravitational Stokes Parameters, **189**, 39, 19-D1.
- Apruzese, John P. A Dust-Shell Model of the Infrared Object HD 45677, **188**, 539, 16-G10.
- Arnett, W. D. See Pardo et al., A Study of Nucleosynthesis during Explosive Carbon Burning, **191**, 711, 48-B1.
- Arnett, W. David. Advanced Evolution of Massive Stars. V. Neon Burning, **193**, 169, 64-F2.
- Arnett, W. David. Advanced Evolution of Massive Stars. VI. Oxygen Burning, **194**, 373, 78-F10.
- Arnett, W. David. Iron Production by 12 C-Detonation Supernovae, **191**, 727, 48-C2.
- Arnett, W. David. See Couch and Arnett, On the Thermal Properties of the Convective Urca Process, **194**, 537, 80-D8.
- Arnett, W. David. See Couch et al., *s*-Process Nucleosynthesis in Massive Stars: Core Helium Burning, **190**, 95, 29-A1.
- Arnett, W. David. See Epstein et al., Can Supernovae Produce Deuterium?, **190**, L13, 30-E3.
- Arnett, W. David. See Hainebach et al., On the *e*-Process: Its Components and their Neutron Excesses, **193**, 157, 64-E3.
- Arnett, W. David. See Talbot and Arnett, Some Recent Results from Galactic and Stellar Evolution Theory, **190**, 605, 36-A11.
- Arnett, W. David, and Schramm, David N. Origin of Cosmic Rays, Atomic Nuclei, and Pulsars in Explosions of Massive Stars (Erratum), **187**, L47, 3-D14.
- Arpigny, C. See Danks et al., The 12 C/ 13 C Ratio in Comet Kohoutek (1973f), **194**, 745, 84-B1.
- Audouze, Jean, and Tinsley, Beatrice M. Galactic Evolution and the Formation of the Light Elements, **192**, 487, 56-E5.
- Auer, L. H., and Norris, John. Neutral Helium Line Strengths. VII. The Population II B Star Barnard 29 in M13, **194**, 87, 74-G12.
- Auman, J. R. See Fast et al., Raman Scattering from H₂ in Jupiter, **187**, 403, 5-F13.
- Avery, R. W. See Michalsky et al., Interstellar Circular Polarization: A Report of Eight New Positive Results, **187**, L13, 3-B11.
- Avni, Y. See Bahcall et al., Optical Properties of HZ Herculis, **191**, 211, 41-A11.
- Avni, Y., and Bahcall, J. N. Mass Limits for the Centaurus X-3 System, **192**, L139, 61-G2.
- Avni, Y., and Bahcall, J. N. Short-Time Optical Variability of X-Ray Sources, **191**, 221, 41-B6.
- Avni, Y., Bahcall, J. N., Joss, P. C., Schreier, E., Tananbaum, H., and Lamb, D. Q. Upper Limit on 2.5-Second Pulsations from Hercules X-1, **188**, L35, 15-D6.
- Ayles, Thomas R., Linsky, Jeffrey L., and Shine, Richard A. Stellar Model Chromospheres. II. Procyon (F5 IV-V), **192**, 93, 50-G7.
- Backer, D. C. Interstellar Scattering of the Vela Pulsar, **190**, 667, 36-F13.
- Backer, D. C. See Rankin et al., Individual Pulse Polarization Properties of Three Pulsars, **188**, 609, 17-E10.
- Backer, D. C., and Fisher, J. R. Pulsar Flux-Density Spectra, **189**, 137, 20-D1.
- Badhwari, G. D. See Golden et al., Rigidity Spectrum of Z≥3 Cosmic-Ray Nuclei in the Range 4 to 285 GV and a Search for Cosmic Antimatter, **192**, 747, 60-F3.
- Bahcall, J. N. See Avni and Bahcall, Mass Limits for the Centaurus X-3 System, **192**, L139, 61-G2.
- Bahcall, J. N. See Avni and Bahcall, Short-Time Optical Variability of X-Ray Sources, **191**, 221, 41-B6.
- Bahcall, J. N. See Avni et al., Upper Limit on 2.5-Second Pulsations from Hercules X-1, **188**, L35, 15-D6.
- Bahcall, J. N., Dyson, F. J., Katz, J. I., and Paczyński, B. Multiple Star Systems and X-Ray Sources, **189**, L17, 21-A1.
- Bahcall, J. N., Joss, P. C., and Avni, Y. Optical Properties of HZ Herculis, **191**, 211, 41-A11.
- Bahcall, Neta A. Optical Properties of X-Ray Clusters of Galaxies, **193**, 529, 70-C1.
- Bahcall, Neta A. The Perseus Cluster: Galaxy Distribution, Anisotropy, and the Mass/Luminosity Ratio, **187**, 439, 7-B3.
- Baity, W. A. See Ulmer et al., 4.8-Second Pulsed X-Rays from Centaurus X-3 at Energy Greater than 7 keV, **191**, 593, 46-A1.
- Baity, W. A. See Ulmer et al., Long-Term Observations of Cygnus X-2 from OSO-7, **189**, 339, 23-F9.
- Baity, W. A. See Ulmer et al., Observations of the 4.8-Hour Variations of Cygnus X-3 above 7 keV from the OSO-7, **192**, 691, 60-B4.
- Baity, W. A. See Ulmer et al., Upper Limit to the X-Ray Flux from the Supernova NGC 5253 above 7 keV from the OSO-7, **193**, 535, 70-C6.
- Baity, W. A., Ulmer, M. P., Wheaton, W. A., and Peterson, L. E. Extended Observations of >7-keV X-Rays from Centaurus X-3 by the OSO-7 Satellite, **187**, 341, 5-B9.
- Baker, P. L. A Deviation-Defect Method for the Detection of Optically Thick Neutral Hydrogen, **187**, 223, 4-A11.
- Baker, P. L. An Experimental Test of the Homogeneity of the Interstellar Medium, **194**, 271, 77-E8.
- Baker, P. L. Fine-Scale Structure of a Cold Hydrogen Layer, **194**, L109, 81-A6.
- Baldwin, J. A., Burbidge, E. M., Burbidge, G. R., Hazard, C., Robinson, L. B., and Wampler, E. J. An Analysis of the Spectrum of the Large-Redshift Quasi-stellar Object OQ 172, **193**, 513, 70-A11.
- Balick, B. See Gull and Balick, Maps of Spatial and Kinematic Structure of Galactic Nebulae. I. H 76α Studies of M17, M42, W51, and DR 21, **192**, 63, 50-E1.
- Balick, B., Gammon, R. H., and Doherty, L. H. The Structure of the Orion Nebula. I. Observations of the C 85α Recombination Line, **188**, 45, 10-D3.
- Balick, Bruce. See Brown et al., The Nature and Distribution of Carbon Recombination-Line Emission in the Rho Ophiuchi Dark Cloud, **192**, 607, 59-C8.
- Balick, Bruce. See Terzian et al., Radio Synthesis Observations of Planetary Nebulae, **188**, 257, 13-D8.
- Balick, Bruce. See Turner et al., Fine Structure in H II Regions. II., **194**, 279, 77-F1.
- Balick, Bruce, and Brown, Robert L. Intense Sub-Arcsecond Structure in the Galactic Center, **194**, 265, 77-E1.

- Balick, Bruce, and Sanders, Robert H. Radio Fine Structure in the Galactic Center, **192**, 325, 54-G4.
- Ball, J. A. See Black et al., Radiofrequency Emission from CH in Comet Kohoutek (1973), **191**, L45, 42-D3.
- Ball, John A. See Gottlieb and Ball, Interstellar Sulfur Monoxide (Erratum), **187**, L47, 3-D14.
- Ball, John A. See Harvey et al., Time Variation in the OH Microwave and Infrared Emission from Late-Type Stars, **191**, 599, 46-A5; Suppl. **27**, 331 (No. 248).
- Ball, John A. See Zuckerman and Ball, On Microwave Recombination Lines from H I Regions, **190**, 35, 28-C9.
- Baratta, G. B., Cassatella, A., and Viotti, R. On the Problem of V1016 Cygni and the Evolutionary Stage of the Symbiotic Stars, **187**, 651, 9-C1.
- Barkat, Z., Reiss, Y., and Rakavy, G. Stars in the Mass Range $7 \lesssim M/M_{\odot} \lesssim 10$ as Candidates for Pulsar Progenitors, **193**, L21, 66-B6.
- Barker, Paul K., and Brown, Timothy. The Dispersal of the Shell of Zeta Ophiuchi, **192**, L11, 53-A12.
- Barkstrom, Bruce R. An Exact Expression for the Temperature Structure of a Homogeneous Planetary Atmosphere Containing Isotropic Scatterers, **190**, 225, 30-B13.
- Barlow, Michael J. See Cohen and Barlow, An Infrared Photometric Survey of Planetary Nebulae, **193**, 401, 68-A8.
- Barnard, A. J. See Mihalas et al., He I $\lambda 4471$ Profiles in B Stars: Calculations with an Improved Line-broadening Theory, **190**, 315, 31-F6.
- Barnes, Aaron. Acceleration of the Solar Wind by the Interplanetary Magnetic Field, **188**, 645, 18-A6.
- Barnes, T. G., Lambert, D. L., and Potter A. E. Infrared Spectra of γ_2 Velorum and ζ Puppis, **187**, 73, 1-F1.
- Barnes, Thomas G., III. See Moffett and Barnes, Rapid Light Variations of YZ Cancri: An Unusual SS Cygni Star, **194**, 141, 75-D6.
- Barnothy, Jeno M., and Barnothy, Madeleine F. Remarks on the Magnitude-Redshift Bands in the Coma Cluster, **189**, 11, 19-B1.
- Barnothy, Madeleine F. See Barnothy and Barnothy, Remarks on the Magnitude-Redshift Bands in the Coma Cluster, **189**, 11, 19-B1.
- Barrett, A. H. See Schwartz et al., Time Variation of the H₂O Maser and Infrared Continuum in Late-Type Stars, **187**, 491, 7-E9.
- Barrus, D. M. See Burek et al., Spectrometric Properties of Crystals for X-Ray Astronomy. I., **191**, 533, 45-C13.
- Barry, Don C., and Cromwell, Richard H. Spectroscopic Comparison of Open Clusters. I. The Reddening, Blanketing, and Metallicity of M67, **187**, 107, 2-A11.
- Barry, George W. Charged Cosmology, **190**, 279, 31-C13.
- Baschek, Bodo. See Norris and Baschek, A Search for Neutral Iron Lines in a Centauri, **193**, 133, 64-C8.
- Baumert, John H. Mean Absolute Magnitudes of Carbon Stars and Related Objects, **190**, 85, 28-G4.
- Beardsley, W. R., Gatewood, G., and Kamper, K. W. A Study of an Early Flare, Radial Velocities, and Parallax Residuals for Possible Orbital Motion of HD 103095 (Groombridge 1830), **194**, 637, 83-A8.
- Beaver, E. A. See Angel et al., Discovery of a Magnetic DA White Dwarf, **194**, L47, 76-F6.
- Beavers, W. I. See Eitter and Beavers, Lunar Occultation Summary. I., **194**, 213, 76-B11; Suppl. **28**, 405 (No. 269).
- Bechis, Kenneth B. See Harvey et al., A Time Variation in the OH Microwave and Infrared Emission from Late-Type Stars, **191**, 599, 46-A5; Suppl. **27**, 331 (No. 248).
- Bechis, Kenneth P. See Lo and Bechis, The V1057 Cygni OH Source: Time Variation, Polarization Properties, and Accurate Position, **190**, L125, 37-G5.
- Becklin, E. E. See Gatley et al., A New Infrared Complex and Molecular Cloud in Orion, **191**, L121, 49-B6.
- Becklin, E. E. See Sutton et al., 34-Micron Observations of Eta Carinae, G333.6-0.2, and the Galactic Center, **190**, L69, 33-G7.
- Becklin, E. E. See Wynn-Williams et al., Infrared Studies of H II Regions and OH Sources, **187**, 473, 7-D8.
- Becklin, E. E. See Zappala et al., Angular Diameter of IRC+10011 at 2.2, 10, and 20 Microns, **192**, 109, 51-A8.
- Becklin, E. E., Frogel, J. A., Kleinmann, D. E., Neugebauer, G., Persson, S. E., and Wynn-Williams, C. G. Infrared Emission from the Southern H II Region H2-3, **187**, 487, 7-E6.
- Becklin, E. E., Frogel, J. A., Neugebauer, G., Persson, S. E., and Wynn-Williams, C. G. The H II Region G33.6-0.2, A Very Powerful 1-20 Micron Source (Erratum), **193**, L153, 73-B7.
- Becklin, E. E., Hawkins, F. J., Mason, K. O., Matthews, K., Neugebauer, G., Packman, D., Sanford, P. W., Schupler, B., Stark, A., and Wynn-Williams, C. G. Infrared, Radio, and X-Ray Observations of Cygnus X-3, **192**, L119, 61-E11.
- Beers, Yardley. See Haque et al., Microwave Spectrum of ¹³C Methanol, **187**, L15, 3-B13.
- Behring, W. E. See Doschek et al., The Widths of the Solar He I and He II Lines at 584, 537, and 304 Å, **190**, L141, 38-A5.
- Behring, W. E. See Feldman and Behring, Solar Coronal Line Profiles in the Extreme-Ultraviolet, **189**, L45, 21-C1.
- Behring, W. E. See Feldman et al., Laser-Plasma Spectra of Highly Ionized Fluorine, **187**, 417, 5-G11.
- Beichman, C. A. See Dyck and Beichman, Observations of Infrared Polarization in the Orion Nebula, **194**, 57, 74-E9.
- Beichman, C. A. See Dyck et al., Infrared Polarization of the Galactic Nucleus, **188**, L103, 18-D13.
- Beichman, C. A., and Chaisson, E. J. Possible Evidence for a Large Magnetic Field in the Orion Infrared Nebula, **190**, L21, 30-E11.
- Bekenstein, Jacob D., and Bowers, Richard L. Do OB Runaways Have Collapsed Companions?, **190**, 653, 36-E11.
- Bell, M. B. Quasar-Cluster Association as a Test of the Cosmological or Local Hypothesis, **194**, 245, 77-C9.
- Bell, M. B., and Fort, D. N. A Quantitative Alternative to the Cosmological Hypothesis for Quasars (Erratum), **191**, 795, 48-G10.
- Belton, Michael J. S. See Wallace et al., The Thermal Structure of the Atmosphere of Jupiter, **193**, 481, 68-G9.
- Berge, Glenn L. The Position and Stokes Parameters of the Integrated 21-Centimeter Radio Emission of Jupiter and Their Variation with Epoch and Central Meridian Longitude, **191**, 775, 48-F5.
- Bernat, A. P. See Robbins and Bernat, Optical Thickness in the He I Singlet Spectrum of Nebulae, **188**, 309, 14-A2.
- Bernat, A. P., and Robbins, R. R. On the Use of Mean Escape Probabilities to Solve Transfer Problems in Nebulae, **189**, 459, 25-E11.
- Berry, G. G. See Wilson et al., Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters, **191**, 357, 43-E11.
- Berthel, R. O. See Fairbairn et al., Oscillator Strengths in the TiO Alpha-Band System, **193**, 273, 65-F3.
- Bessell, M. S. See Vidal et al., Photoelectric and Spectroscopic Observations of WRA 795, **188**, 163, 11-E13.
- Bessell, M. S. See Vidal et al., Spectroscopic Studies of a Suggested Optical Candidate for Centaurus X-3, **191**, L23, 42-B11.
- Bessell, M. S. See Wickramasinghe et al., 2U 0900-40: A Black Hole?, **188**, 167, 11-F4.
- Bessell, M. S., Peterson, B. A., Wickramasinghe, D. T., and Vidal, N. V. 2U 1700-37: Another Black Hole?, **187**, 355, 5-C10.
- Bhatia, A. K. See Jacobs et al., Radiative Transitions Involving the $(2p^2)$ 3P Metastable Autodetaching State of H⁻, **191**, 785, 48-G1.
- Bignami, G. F. See Thompson et al., SAS-2 Observations of the High-Energy Gamma Radiation from the Vela Region, **190**, L51, 33-F4.
- Bignami, G. F., and Fichtel, C. E. Galactic Arm Structure and Gamma-Ray Astronomy, **189**, L65, 24-E7.
- Bignell, Carl. See Terzian et al., Radio Synthesis Observations of Planetary Nebulae, **188**, 257, 13-D8.
- Bignell, R. C. Recombination Lines in Planetary Nebulae at 15 Gigahertz, **193**, 687, 71-G3.

- Bisiacchi, G. F., Dultzin, D., Firmani, C., and Hacyan, S. On the Interpretation of the $\text{H}\alpha \lambda 4686$ Emission Line in HDE 226868 (Cygnus X-1). **190**, L59, 33-F11.
- Bjorkholm, P. See Trombka et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. II. X-Ray Time Profile and Source Location. **194**, L27, 76-E2.
- Black, J. H. See Dalgarno et al., Hydrogen Chloride in Dense Interstellar Clouds. **192**, L37, 53-C7.
- Black, J. H., Chaissson, E. J., Ball, J. A., Penfield, H., and Lilley, A. E. Radiofrequency Emission from CH in Comet Kohoutek (1973f). **191**, L45, 42-D3.
- Black, John Harry. See Aaronson et al., A Search for Molecular Hydrogen in Quasar Absorption Spectra. **191**, L53, 46-A10.
- Blair, G. N. See Davis et al., vibrationally Excited Silicon Monoxide in the Orion Nebula. **190**, L117, 37-F13.
- Blair, G. N. See Thaddeus et al., Detection of the $J = 1 \rightarrow 0$ Rotational Transition of vibrationally Excited Silicon Monoxide. **192**, L33, 53-C3.
- Blake, R. L. See Burek et al., Spectrometric Properties of Crystals for X-Ray Astronomy. I. **191**, 533, 45-C13.
- Blankenship, L. C. See Hjellming et al., Some Problems with the Radio Source Cygnus X-3. **194**, L13, 76-D1.
- Blatt, S. L. See Vlieks et al., Reaction Rates of Interest in Late Stages of Stellar Nucleosynthesis. **191**, 699, 48-A1.
- Bleeker, J. A. M. See de Korte et al., Observation of Enhanced Soft X-Ray Emission from the Vicinity of the North Polar Spur. **190**, L5, 30-D7.
- Blumenthal, George R. The Poynting-Robertson Effect and Edington Limit for Electrons Scattering with Hard Photons. **188**, 121, 11-C4.
- Bodenheimer, Peter, and Ostriker, Jeremiah P. Do Pulsars Make Supernovae? II. Calculations of Light Curves for Type II Events. **191**, 465, 44-F6.
- Boesaard, Ann Merchant. Measurements of Magnetic Fields in Young Main-Sequence Stars. **188**, 567, 17-B10.
- Boesaard, Ann Merchant, and Hagen, Wendy. The Age of Alpha Centauri. **189**, 85, 19-G4.
- Boesaard, Ann Merchant, Praderie, Françoise, Leckrone, David S., Faraggiana, R., and Hack, M. The Abundance of Boron and Beryllium in Alpha Lyrae. **194**, L143, 84-F1.
- Boeshaar, G. O., Czyzak, S. J., and Aller, L. H. Spectrophotometric Observations of NGC 6543. **193**, 290, 65-G6; Suppl. **28**, 335 (No. 264).
- Boeshaar, Gregory O. Filamentary Structure in Planetary Nebulae. **187**, 283, 4-E10.
- Böhm, K.-H. See Fontaine et al., The Effects of Differences in Composition, Equation of State, and Mixing Length upon the Structure of White-Dwarf Convection Zones. **193**, 205, 65-A9.
- Böhm, K.-H., Schwartz, R. D., and Siegmund, W. A. The Continuous Spectrum of Herbig-Haro Objects. **193**, 353, 67-E4.
- Böhm-Vitense, E., and Canterna, R. The Gap in the Two-Color Diagram of Main-Sequence Stars. **194**, 629, 83-A1.
- Böhm-Vitense, E., Szkody, P., Wallerstein, G., and Iben, Icko, Jr. Masses and Luminosities of Population II Cepheids. **194**, 125, 75-C6.
- Böhm-Vitense, Erika. The Luminosities of Population II Cepheids. **188**, 571, 17-B13.
- Böhm-Vitense, Erika, and Szkody, Paula. *UBVr* Colors for Population II Giants. **193**, 607, 71-A4.
- Bohme, D. K. See Schiff et al., Laboratory Measurements of Some Ion-Molecule Reactions Related to the Formation of HCN in Dense Interstellar Clouds. **191**, L49, 42-D7.
- Bohuski, T. J., Dufour, R. J., and Osterbrock, D. E. Nebular Photometry with an Echelle Spectrometer: [O III] Line Ratios in NGC 1976 and NGC 6853. **188**, 529, 16-F14.
- Bohuski, Thomas J., and Smith, Malcolm G. Old Planetary Nebulae and the Relation between Size and Expansion Velocity. **193**, 197, 65-A1.
- Bohd, E. A. See Holt et al., A New Measurement of the Hercules X-1 X-Ray Pulse Profile. **190**, L109, 37-F7.
- Boldt, E. A. See Holt et al., On the Nature of the Unidentified High-Latitude *Uhuru* Sources. **188**, L97, 18-D8.
- Boldt, E. A. See Rothschild et al., Millisecond Temporal Structure in Cygnus X-1. **189**, L13, 20-G11.
- Bolton, C. T. High-Dispersion Spectroscopy of the Sigma Orionis System. **192**, L7, 53-A9.
- Bonazzola, Silvano, and Schneider, Jean. An Exact Study of Rigidly and Rapidly Rotating Stars in General Relativity with Application to the Crab Pulsar. **191**, 273, 41-F2.
- Bond, Howard E. The Subgiant CH Stars. **194**, 95, 75-A5.
- Bonneau, D. See Labeyrie et al., Speckle Interferometry. III. High-Resolution Measurements of Twelve Close Binary Systems. **194**, L147, 84-F5.
- Bonsack, Walter K. See Jones et al., The Holmium Ap Star 51418. **190**, 579, 35-G2.
- Bonsack, Walter K., and Pilachowski, Catherine A. The Extraordinarily Slow Magnetic Variation of Gamma Equulei. **190**, 327, 31-G4.
- Bonsack, Walter K., Pilachowski, Catherine A., and Wolff, Sidney C. The Variations of the Magnetic Ap Star 49 Camelopardalis. **187**, 265, 4-D7.
- Bopp, Bernard W. A Spectroscopic Study of YY Geminorum. **193**, 389, 67-G11.
- Bopp, Bernard W. See Hackwell et al., Infrared Observations of BD-10°4662. **192**, L79, 57-F11.
- Bopp, Bernard W., and Moffett, Thomas J. High Time Resolution Studies of UV Ceti (Erratum). **191**, 289, 41-G3.
- Borken, R. See Rappaport et al., X-Ray Structure of the Cygnus Loop. **194**, 329, 78-C3.
- Borken, R. See Williamson et al., Observations of Features in the Soft X-Ray Background Flux. **193**, L133, 73-A1.
- Borra, Ermanno F. On the Interpretation of the Magnetic Curves of the Ap Stars as Determined by the Photographic Technique. **188**, 287, 13-F9.
- Borra, Ermanno F. The Orientation of Magnetic Axes in Ap Stars: An Alternative Interpretation of the Component with Small Obliquity. **187**, 271, 4-D13.
- Borra, Ermanno F. Spectral Changes Induced by the Zeeman Effect in Oblique Rotator Models. **193**, 699, 72-A1.
- Bortolot, V. J. See Shulman et al., Weak Interstellar Lines in the Visible Spectrum of Zeta Ophiuchi. **193**, 97, 64-A1.
- Bowers, Richard L. See Bekenstein and Bowers, Do OB Runaways Have Collapsed Companions?. **190**, 653, 36-E11.
- Bowers, Richard L., and Liang, E. P. T. Anisotropic Spheres in General Relativity. **188**, 657, 18-B3.
- Bowyer, Stuart. See Crudace et al., On the Opacity of the Interstellar Medium to Ultraviolet X-Rays and Extreme-Ultraviolet Radiation. **187**, 497, 7-F1.
- Bowyer, Stuart. See Margon et al., A Search for a Cosmological Component of the Soft X-Ray Background in the Direction of M31. **191**, L117, 49-B3.
- Bowyer, Stuart. See Paresce et al., Further Evidence for an Interstellar Source of Nighttime He I 584 Å Radiation. **188**, L71, 15-F8.
- Bowyer, Stuart. See Paresce et al., Observations of He I 584 Å Nighttime Radiation: Evidence for an Interstellar Source of Neutral Helium. **187**, 633, 9-A12.
- Bowyer, Stuart, Margon, Bruce, Lampton, Michael, and Crudace, Ray. Observation of X-Ray Emission from M31. **190**, 285, 31-D5.
- Boyle, Robert J. See Turner et al., Fine Structure in H II Regions. II. **194**, 279, 77-F1.
- Bradt, H. See Spada et al., Limits on Rapid X-Ray Pulsing in X-Ray Binaries. **190**, L113, 37-F10.
- Bradt, H. V. See Sprott et al., Limit on X-Ray Emission from a Supernova during Maximum Light. **191**, 739, 48-C13.
- Brecher, K., and Morrison, P. Cosmic Gamma-Ray Bursts from Directed Stellar Flares. **187**, L97, 9-D6.
- Brecher, K., and Morrison, P. Do Cosmic Rays Heat HZ Herculis?. **187**, 349, 5-C5.
- Brecher, Kenneth, and Wasserman, Ira. On Changes in the Pulsation Period of Hercules X-1. **192**, L125, 61-F7.
- Bredenkamp, J. H. See Stecker et al., Possible Evidence for Structured Acceleration of Cosmic Rays on a Galactic Scale from Recent γ-Ray Observations. **188**, L59, 15-E13.

- Breger, Michel. Calibrations and Applications of the *uvby* Photometric Systems. **192**, 75, 50-F4.
- Breger, Michel. Pre-Main-Sequence Stars. III. Herbig Be/Ae Stars and Other Selected Objects. **188**, 53, 10-D11.
- Breger, Michel. Rapid Line Variability. I. The Ap Stars Epsilon Ursae Majoris and 73 Draconis. **192**, 71, 50-E14.
- Breuer, Reinhard A. See Anile and Breuer, Gravitational Stokes Parameters. **189**, 39, 19-D1.
- Bridges, J. M., and Kornblith, R. L. Arc Measurements of Fe i Oscillator Strengths. **192**, 793, 61-B5.
- Briggs, F. H. The Microwave Properties of Saturn's Rings. **189**, 367, 24-A10.
- Brinkman, A. C., Parsignault, D. R., Schreier, E., Gursky, H., Kellogg, E. M., Tananbaum, H., and Giacconi, R. Correlation Analysis of X-Ray Emission from Cygnus X-1. **188**, 603, 17-E3.
- Broderick, J. J. See Kellermann et al., Further Observations of Apparent Changes in the Structure of 3C 273 and 3C 279. **189**, L19, 21-A3.
- Broderick, J. J. See Mutel et al., VLB Observations of the Crab Nebula and the Wavelength Dependence of Interstellar Scattering. **193**, 279, 65-F9.
- Broderick, J. J., and Brown, Robert L. Compact Radio Structure in the H II Region G351.6-1.3. **192**, 343, 55-A10.
- Brooks, Neil H., and Smith, Wm. Hayden. Radiative and Predisociation Probabilities for Individual Rotation Levels of the $B^2\Sigma$ State of CH with Application to the Radiative Recombination of CH in the Interstellar Medium. **194**, 513, 80-C1.
- Brown, D. N., Rich, A., and Williams, W. L. Further Observations for Circularly Polarized Radiation from White Dwarfs and X-Ray Sources. **191**, L111, 49-A11.
- Brown, G. Stanley, and Tinsley, Beatrice M. Galaxy Counts as a Cosmological Test. **194**, 555, 82-B1.
- Brown, Larry W. Jupiter Emission Observed near 1 MHz. **192**, 547, 57-B8.
- Brown, Larry W. Spectral Behavior of Jupiter near 1 MHz. **194**, L159, 84-G4.
- Brown, R. D. See Fourikis et al., A Search for Interstellar Nitroxyl (HNO). **194**, 41, 74-D8.
- Brown, R. L. See Hjellming et al., Some Problems with the Radio Source Cygnus X-3. **194**, L13, 76-D1.
- Brown, Robert A. See McElroy et al., Sodium Emission from Io: Implications. **187**, L127, 9-F3.
- Brown, Robert A., and Chaffee, Frederic H., Jr. High-Resolution Spectra of Sodium Emission from Io. **187**, L125, 9-F1.
- Brown, Robert L. Radio Observations of the Infrared Source AFCRL 809-2992. **194**, L9, 76-C11.
- Brown, Robert L., Gammon, R. H., Knapp, G. R., and Balick, Bruce. The Nature and Distribution of Carbon Recombination-Line Emission in the Rho Ophiuchi Dark Cloud. **192**, 607, 59-C8.
- Brown, Robert L., and Gómez-González, J. The He⁺/H⁺ Ratio in Dark Clouds. **188**, 475, 16-C4.
- Brown, Robert L., and Knapp, G. R. Detection of Radio Recombination-Line Emission from the Rho Ophiuchi Dark Cloud. **189**, 253, 22-G3.
- Brown, Robert L. See Balick and Brown, Intense Sub-Arcsecond Structure in the Galactic Center. **194**, 265, 77-E1.
- Brown, Robert L. See Broderick and Brown, Compact Radio Structure in the H II Region G351.6-1.3. **192**, 343, 55-A10.
- Brown, Timothy. See Barker and Brown, The Dispersal of the Shell of Zeta Ophiuchi. **192**, L11, 53-A12.
- Brucato, R. J., and Zappala, R. R. Observations of H α in HDE 22688. **189**, L71, 24-E12.
- Brzozowski, J. See Erman et al., Oscillator Strengths for Neutral Sodium and the Interstellar Sodium Abundance in Zeta Ophiuchi. **192**, 59, 50-D11.
- Brzozowski, J., Elander, N., Erman, P., and Lyra, M. On the Interstellar Abundance of the CH⁺ Radical. **193**, 741, 72-D1.
- Buchler, J.-R. See Littleton and Buchler, Electron-Ion Relaxation in a Dense Plasma. **191**, 731, 48-C5.
- Buerger, Paul F. See Collins and Buerger, The Transfer of Circularly Polarized Radiation. **187**, 163, 2-E7.
- Buff, James, and McCray, Richard. Accretion Flows in Galactic X-Ray Sources. I. Optically Thin Spherically Symmetric Model. **189**, 147, 20-D10.
- Buff, James, and McCray, Richard. Soft X-Ray Variability of Binary X-Ray Stars. **188**, L37, 15-D7.
- Buhl, D. See Snyder and Buhl, Detection of Possible Maser Emission near 3.48 Millimeters from an Unidentified Molecular Species in Orion. **189**, L31, 21-B1.
- Buhl, D. See Snyder et al., Radio Detection of Interstellar Dimethyl Ether. **191**, L79, 46-C7.
- Buhl, D. See Zuckerman et al., ¹²C/¹³C Abundance Ratios from Observations of Interstellar H₂¹³C¹⁶O. **189**, 217, 22-D7.
- Buhl, David. See Clark et al., Observational Evidence for the Excitation of HCN and H₂O in Protostellar Molecular Clouds. **190**, 545, 35-D10.
- Buhl, David, Snyder, Lewis E., Lovas, Frank J., and Johnson, Donald R. Silicon Monoxide: Detection of Maser Emission from the Second vibrationally Excited State. **192**, L97, 58-A1.
- Bui-Van, A., and Hurley, K. Multiple Inverse Compton Scattering and the Diffuse X-Ray Component. **188**, L51, 15-E6.
- Bui-Van, A., Hurley, K., and Vedrenne, G. High-Energy X-Rays from the Perseus Cluster. **188**, 217, 13-A11.
- Bunner, A. N. See Williamson et al., Observations of Features in the Soft X-Ray Background Flux. **193**, L133, 73-A1.
- Burbidge, E. M. See Baldwin et al., An Analysis of the Spectrum of Large-Redshift Quasi-stellar Object OQ 172. **193**, 513, 70-A11.
- Burbidge, E. M. See Strittmatter et al., Spectroscopic Observations of Objects Identified with Radio Sources. **190**, 509, 35-A4.
- Burbidge, G. R. See Baldwin et al., An Analysis of the Spectrum of the Large-Redshift Quasi-stellar Object OQ 172. **193**, 513, 70-A11.
- Burbidge, G. R., Jones, T. W., and O'Dell, S. L. Physics of Compact Nonthermal Sources. III. Energetic Considerations. **193**, 43, 63-D4.
- Burek, A. J., Barrus, D. M., and Blake, R. L. Spectrometric Properties of Crystals for X-Ray Astronomy. I. **191**, 533, 45-C13.
- Burginyon, G. See Hill et al., An Unusual X-Ray Source in Scutum. **189**, L69, 24-E9.
- Burginyon, G. A. See Hill et al., A Search for Soft X-Ray Sources in the Galactic Anticenter. Absorption of X-Rays from the Crab Nebula. **187**, 505, 7-F9.
- Burke, John Robert. See Silk and Burke, Dust Grains in a Hot Gas. II. Astrophysical Applications. **190**, 11, 28-A14.
- Burke, John Robert, and Silk, Joseph. Dust Grains in a Hot Gas. I. Basic Physics. **190**, 1, 28-A4.
- Burkhead, Martin S. See Kalinowski et al., On a Possible Carbon-Star Member of the Old Open Cluster Trumpler 5. **193**, L77, 69-D8.
- Burlaga, L. F., and Scudder, J. D. Sweet's Mechanism in the Solar Wind. **191**, L149, 49-D3.
- Buti, B. Magnetoacoustic Instability and Termination of Solar Wind. **192**, 757, 60-F11.
- Caldwell, John J. See Savage and Caldwell, Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIII. The Albedos of Jupiter, Uranus, and Neptune. **187**, 197, 2-G8.
- Callahan, Philip S. Interpretation of Columnar Content Measurements of the Solar-Wind Turbulence. **187**, 185, 2-F12.
- Campbell, D. B. See Rankin et al., The Crab Nebula Pulsar: Radiofrequency Spectral Variability. **193**, L71, 69-D2.
- Campbell, D. B. See Rankin et al., Individual Pulse Polarization Properties of Three Pulsars. **188**, 609, 17-E10.
- Canal, Ramon. Nucleosynthesis of Lithium in Low-Energy Flares. **189**, 531, 26-C12.
- Canfield, Richard C. A Simplified Method for Calculation of Radiative Energy Loss Due to Spectral Lines. **194**, 483, 79-G3.
- Canfield, Richard C. See Altrock and Canfield, Analysis of the Solar Magnesium I Spectrum. **194**, 733, 84-A3.
- Canizares, C. R. See McClintock et al., A Ten-Day Observation of Hercules X-1 from the OSO-7 Satellite. **188**, 159, 11-E9.
- Canizares, C. R., Li, F. K., and Clark, G. W. OSO-7 Observa-

- tions of Circinus X-1, **191**, L75, 46-C3.
- Canizares, C. R., and McClintock, J. E. Upper Limits to Optical Pulsations from Centaurus X-3, **193**, L65, 69-C10.
- Canizares, C. R., Neighbours, J. E., and Matilsky, T. A Search for X-Rays from Supernova 1972e with *Uhuru* and OSO-7, **192**, L61, 57-E10.
- Canterna, R. See Böhm-Vitense and Canterna, The Gap in the Two-Color Diagram of Main-Sequence Stars, **194**, 629, 83-A1.
- Canuto, V. See Lodenquai et al., Photon Opacity in Surfaces of Magnetic Neutron Stars, **190**, 141, 29-D3.
- Capps, R. W. See Dyck et al., Infrared Fluxes, Spectral Types, and Temperatures for Very Cool Stars, **189**, 89, 19-G7.
- Capps, R. W. See Dyck et al., Infrared Polarization of the Galactic Nucleus, **188**, L103, 18-D13.
- Capps, R. W. See Knacke and Capps, Infrared Polarization of NGC 1068, **192**, L19, 53-B4.
- Capps, R. W. See Strom et al., Infrared Observations of H II Regions in External Galaxies, **193**, L7, 66-A8.
- Carbon, Duane F. A Comparison of the Straight-Mean, Harmonic-Mean, and Multiple-Picket Approximations for the Line Opacities in Cool Model Atmospheres, **187**, 135, 2-C9.
- Cardiasmenos, A. G. See Chui et al., The Methanol Source in Orion at 1.2 Centimeters, **187**, L19, 3-C2.
- Carleton, N. P. See Hegyi et al., Cosmic Background Radiation at 1.32 Millimeters, **190**, 543, 35-D8.
- Carleton, N. P. See Traub et al., Search for Deuterium in Orion and Detection of High-Velocity Features, **190**, L81, 34-A4.
- Carlson, Eric D., and Henize, Karl G. The Peculiar Star He 2-177: A Slow Nova and a Possible X-Ray Source, **188**, L47, 15-E2.
- Carlson, R. W. Molecular-Hydrogen Absorption Features in the Spectrum of Quasi-stellar Object 4C 05.34, **190**, L99, 37-E9.
- Caroff, Lawrence J. See Scargle et al., QSO Envelopes: Optically Thin, Low Density, and Normal Abundances?, **189**, 181, 22-B2.
- Carr, T. D. See Donivan et al., Radio Observations of Two Clusters of Galaxies, **187**, 11, 1-A11.
- Carr, T. D. See Mutel et al., VLB Observations of the Crab Nebula and the Wavelength Dependence of Interstellar Scattering, **193**, 279, 65-F9.
- Carr, Thomas D. See Desch and Carr, Dekametric and Hectometric Observations of Jupiter from the RAE-1 Satellite, **194**, L57, 76-G1.
- Carson, T. R., Ezer, D., and Stothers, R. Solar Neutrinos and the Influence of Radiative Opacities on Solar Models, **194**, 743, 84-A12.
- Carswell, R. F. See Angel et al., Discovery of a Magnetic DA White Dwarf, **194**, L47, 76-F6.
- Carswell, R. F. See Strittmatter et al., Spectroscopic Observations of Objects Identified with Radio Sources, **190**, 509, 35-A4.
- Carswell, R. F. See Weedman and Carswell, The Starlike Nucleus of NGC 6207, **188**, 1, 10-A4.
- Carswell, R. F., Strittmatter, P. A., Williams, R. E., Kinman, T. D., and Serkowski, K. Optical Observations of the Radio Source 0735+178, **190**, L101, 37-E11.
- Cash, W. See Rappaport et al., Possible Detection of Very Soft X-Rays from SS Cygni, **187**, L5, 3-B5.
- Casleton, K. H. See Gaines et al., Beam Maser Measurements of CH₃OH Rotational Transitions, **191**, L99, 46-E1.
- Cassatella, A. See Baratta et al., On the Problem of V1016 Cygni and the Evolutionary Stage of the Symbiotic Stars, **187**, 651, 9-C1.
- Cassinelli, Joseph P., and Haisch, Bernhard M. Polarization by Rotationally Distorted Electron-Scattering Atmospheres, **188**, 101, 11-A13.
- Castor, John I. The Effect of Sphericity on Stellar Continuous Energy Distributions, **189**, 273, 23-B1.
- Catura, R. C., Acton, L. W., Johnson, H. M., and Zaumen, W. T. The Extended X-Ray Source in Virgo and its Relation to M87, **190**, 521, 35-B1.
- Cesarsky, Catherine J. See Cesarsky and Cesarsky, Observations of Recombination-Line Emission in the Direction of Two Supernova Remnants (Erratum), **187**, L47, 3-D14.
- Cesarsky, Diego A. See Allen et al., A Search for OD in the Galactic Center, **188**, 33, 10-C5.
- Cesarsky, Diego A. See Pasachoff and Cesarsky, Further Observations at the Interstellar Deuterium Frequency, **193**, 65, 63-E13.
- Cesarsky, Diego A., and Cesarsky, Catherine J. Observations of Recombination-Line Emission in the Direction of Two Supernova Remnants (Erratum), **187**, L47, 3-D14.
- Cess, R. D. See Ramanathan and Cess, Radiative Transfer within the Mesospheres of Venus and Mars, **188**, 407, 15-A5.
- Chaffee, Frederic. See Schild et al., The Nature of Infrared Excesses in Extreme Br Stars, **190**, 73, 28-F7.
- Chaffee, Frederic H., Jr. Line Spectra in Interstellar Clouds. I. The Perseus 2 Cloud, **189**, 427, 25-C5.
- Chaffee, Frederic H., Jr. See Brown and Chaffee, High-Resolution Spectra of Sodium Emission from Io, **187**, L125, 9-F1.
- Chaisson, E. J. High-Frequency Observations of Possible "Heavy-Element" Recombination Lines, **191**, 411, 44-B8.
- Chaisson, E. J. On the Recombination-Line Observations toward Supernova 3C 391, **189**, 69, 19-F3.
- Chaisson, E. J. See Beichman and Chaisson, Possible Evidence for a Large Magnetic Field in the Orion Infrared Nebula, **190**, L21, 30-E11.
- Chaisson, E. J. See Black et al., Radiofrequency Emission from CH in Comet Kohoutek (1973f), **191**, L45, 42-D3.
- Chaisson, E. J. See Sistla et al., Radio-Continuum Measurements of Planetary Nebulae at 15.5 GHz, **192**, 165, 51-E1.
- Chaisson, E. J., and Lada, C. J. Recombination Lines from H I Gas toward Orion A, **189**, 227, 22-E3.
- Chamberlain, J. W., and Wallace, L. Formation of Coupled Spectral Lines in a Planetary Atmosphere, **190**, 487, 33-D7.
- Chan, J. H., and Price, P. B. Anomalies in the Composition of Interplanetary Heavy Ions with $0.01 < E < 40$ MeV per amu, **190**, L39, 30-G3.
- Chandrasekhar, S. On a Criterion for the Onset of Dynamical Instability by a Nonaxisymmetric Mode of Oscillation along a Sequence of Differentially Rotating Configurations, **187**, 169, 2-E12.
- Chandrasekhar, S., and Elbert, Donna D. The Deformed Figures of the Dedekind Ellipsoids in the Post-Newtonian Approximation to General Relativity, **192**, 731, 60-E1.
- Channmugam, G. Gamma-Ray Bursts from Magnetic White Dwarfs, **193**, L75, 69-D6.
- Chapline, G. F. See Weaver and Chapline, Dissipation in Supernova Shock Waves, **192**, L57, 57-E6.
- Chapman, G. A. On the Nature of the Small-Scale Solar Magnetic Field, **191**, 255, 41-D11.
- Chen, Hsing-Hen, Ruderman, Malvin A., and Sutherland, Peter G. Structure of Solid Iron in Superstrong Neutron-Star Magnetic Fields, **191**, 473, 44-F13.
- Cheng, C. C. See Ramaty et al., Scorpius X-1: Origin of the Radio and Hard X-Ray Emissions, **187**, 61, 1-E3.
- Cheng, Chung-Chieh. See Widening and Cheng, On the Fe xxiv Emission in the Solar Flare of 1973 June 15, **194**, L111, 81-A8.
- Chetin, Timur. See Jones et al., Optical Studies of *Uhuru* Sources. VIII. Observations of 92 Possible Counterparts of X-Ray Sources, **190**, L1, 30-D4.
- Chetin, Timur. See Jones et al., Optical Studies of *Uhuru* Sources. VIII. Observations of 92 Possible Counterparts of X-Ray Sources, **190**, L1, 30-D4.
- Cheung, A. C. See Chui et al., The Methanol Source in Orion at 1.2 Centimeters, **187**, L19, 3-C2.
- Chevalier, Roger A. The Evolution of Supernova Remnants. I. Spherically Symmetric Models, **188**, 501, 16-E2.
- Chevalier, Roger A., and Gardner, John. The Evolution of Supernova Remnants. II. Models of an Explosion in a Plane-stratified Medium, **192**, 457, 56-C4.
- Chincarini, Guido L., and Rood, Herbert J. Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. IV. Double Compact Galaxies, **194**, 21, 74-C2.
- Christy-Sackmann, I-Juliana, and Despain, Keith H. An In-

- terpretation of the Puzzling Observations of FG Sagittae, **189**, 523, 26-C4.
- Chui, M. F., Cheung, A. C., Matsakis, D., Townes, C. H., and Cardiasmenos, A. G. The Methanol Source in Orion at 1.2 Centimeters, **187**, L19, 3-C2.
- Clark, B. G. See Kellermann et al., Further Observations of Apparent Changes in the Structure of 3C 273 and 3C 279, **189**, L19, 21-A3.
- Clark, F. O. See Snyder et al., Radio Detection of Interstellar Dimethyl Ether, **191**, L79, 46-C7.
- Clark, F. O., and Johnson, D. R. Magnetic Fields in the Orion Molecular Cloud from the Zeeman Effect in SO, **191**, L87, 46-D1.
- Clark, Frank O., Buhl, David, and Snyder, Lewis E. Observational Evidence for the Excitation of HCN and H₂O in Protostellar Molecular Clouds, **190**, 545, 35-D10.
- Clark, G. W. See Canizares et al., OSO-7 Observations of Circinus X-1, **191**, L75, 46-C3.
- Clark, G. W. See Heinz et al., OSO-7 Observations of a High-Latitude X-Ray Source Associated with Abell Cluster A2052, **188**, L41, 15-D11.
- Clark, G. W. See McClintock et al., A Ten-Day Observation of Hercules X-1 from the OSO-7 Satellite, **188**, 159, 11-E9.
- Clark, G. W. See Sprott et al., Limit on X-Ray Emission from a Supernova during Maximum Light, **191**, 739, 48-C13.
- Clark, George W. See Li and Clark, Observations of an Absorption Dip in the X-Ray Intensity of Cygnus X-1, **191**, L27, 42-C1.
- Clark, George W. See Winkler and Clark, X-Ray Observations of the Supernova Remnant IC 443, **191**, L67, 46-B9.
- Clark, T. A. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, **193**, 293, 67-A4.
- Clayton, Donald D. Line ⁸⁷Co Gamma Rays: New Diagnostic of Supernova Structure, **188**, 155, 11-E6.
- Clayton, Donald D. See Hainebach et al., On the *e*-Process: Its Components and their Neutron Excesses, **193**, 157, 64-E3.
- Clayton, Donald D. See Hoyle and Clayton, Nucleosynthesis in White-Dwarf Atmospheres, **191**, 705, 48-A8.
- Clayton, Donald D., and Hoyle, Fred. Gamma-Ray Lines from Novae, **187**, L101, 9-D9.
- Clayton, Donald D., and Newman, Michael J. *s*-Process Studies: Exact Solution to a Chain Having Two Distinct Cross-Section Values, **192**, 501, 56-F5.
- Clayton, Donald D., and Ward, Richard A. *s*-Process Studies: Exact Evaluation of an Exponential Distribution of Exposures, **193**, 397, 68-A5.
- Cleary, M. N. See Mathewson et al., The Magellanic Stream, **190**, 291, 31-D9.
- Clegg, P. E. See Ade et al., Limits to Solar Limb Darkening at a Wavelength of 1.4 Millimeters Derived from Antenna-Beam Parameters, **187**, 389, 5-E13.
- Clegg, Peter E. See Ade et al., 1-Millimeter Observations of the Galactic H II Regions M42 and DR 21, **189**, L23, 21-A7.
- Clement, Maurice J. On the Solution of Poisson's Equation for Rapidly Rotating Stars, **194**, 709, 83-F8.
- Cochran, William D. See Spitzer et al., Column Densities of Interstellar Molecular Hydrogen, **193**, 759, 72-E4; Suppl. **28**, 373 (No. 266).
- Cocke, W. J. Stimulated Linear Acceleration Radiation: A Pulsar Radio Emission Mechanism (Erratum), **187**, 211, 3-A9.
- Cocke, W. J. See Ferguson et al., Optical Polarization of the Crab Nebula Pulsar. III. New Observations, Predictions, and the Possibility of Variability, **190**, 375, 32-C10.
- Cocke, W. J., and Ferguson, D. C. Color-Difference Photometry of the Crab Nebula Pulsar and the Rotating Relativistic Vector Model, **194**, 725, 83-G10.
- Code, Arthur D. See Gallagher and Code, Ultraviolet Photometry from the Orbiting Astronomical Observatory. X. Nova FH Serpentis 1970, **189**, 303, 23-D1.
- Cohen, J. G. Interstellar Lines in Stars at High Galactic Latitudes, **194**, 37, 74-D4.
- Cohen, Jeffrey M. See Adams et al., Analytic Pulsar Models, **192**, 525, 57-A1.
- Cohen, Judith G. Optical Interstellar Lines in Dark Clouds. II. K I and Ultraviolet Sodium Lines, **192**, 379, 55-D7.
- Cohen, Judith G. See Snow and Cohen, Diffuse Interstellar Band Formation in Dense Clouds, **194**, 313, 78-B2.
- Cohen, Judith G., and Wallerstein, George. On the Velocity Structure of the Interstellar Clouds near Rho Ophiuchi, **189**, 259, 22-G9.
- Cohen, Leon. See Ahmad and Cohen, Dynamical Friction in Gravitational Systems, **188**, 469, 16-B13.
- Cohen, Leonard. See Doschek et al., Transitions $2s^2 2p^k - 2s 2p^{k+1}$ of the Fe, OI, and Ni Isoelectronic Sequences, **188**, 417, 15-B1.
- Cohen, Leonard. See Goldsmith et al., The Spectra of S XIII and S XIV in the Region 25–40 Å, **188**, 197, 12-A9.
- Cohen, M. H. See Kellermann et al., Further Observations of the Apparent Changes in the Structure of 3C 273 and 3C 279, **189**, L19, 21-A3.
- Cohen, M. H., and Cronyn, W. M. Scintillation and Apparent Angular Diameter, **192**, 193, 51-G3.
- Cohen, Martin. See Fawley and Cohen, The Open Cluster NGC 7419 and Its M7 Supergiant IRC +60 375, **193**, 367, 67-F3.
- Cohen, Martin. See Treffers and Cohen, High-Resolution Spectra of Cool Stars in the 10- and 20-Micron Regions, **188**, 545, 17-A1.
- Cohen, Martin, and Barlow, Michael J. An Infrared Photometric Survey of Planetary Nebulae, **193**, 401, 68-A8.
- Colgate, S. A. Early Gamma Rays from Supernovae, **187**, 333, 5-B2.
- Colgate, Stirling A. The Formation of Deuterium and the Light Elements by Spallation in Supernova Shocks, **187**, 321, 5-A4.
- Collins, G. W., II. See Roark et al., Monte Carlo Model of Reflection Nebulae: Intensity Gradients, **190**, 67, 28-F1.
- Collins, George W., II. Calculations of Theoretical Rotational Line Profiles for the Determination of $v \sin i$ in the Spectral Range 09OF8, **191**, 157, 40-E3.
- Collins, George W., II., and Buerger, Paul F. The Transfer of Circularly Polarized Radiation, **187**, 163, 2-E7.
- Colvin, Jeffrey D. On the Significance of the Cernekov Process in Quasi-stellar Objects, **190**, 515, 35-A10.
- Condon, J. J. Confusion and Flux-Density Error Distributions, **188**, 279, 13-F1.
- Condon, J. J., Yerbury, J., and Jauncey, D. L. Interpretation of Saturn's Decimetric Radio Emission, **193**, 257, 65-E1.
- Connes, Pierre, and Michel, Guy. High-Resolution Fourier Spectra of Stars and Planets, **190**, L29, 30-F5.
- Conti, Peter S. Spectroscopic Studies of O-Type Stars. IV. Lines in the Red Region, **187**, 539, 8-B4.
- Conti, Peter S., and Frost, Stewart A. Variations of the Emission Line Profiles in the O6ef Star Lambda Cephei, **190**, L137, 38-A1.
- Conti, Peter S., and Leep, Eva M. Spectroscopic Observations of O-Type Stars. V. The Hydrogen Lines and $\lambda 4686$ He II, **193**, 113, 64-B2.
- Cooper, J. See Mihalas et al., He I $\lambda 4471$ Profiles in B Stars: Calculations with an Improved Line-broadening Theory, **190**, 315, 31-F6.
- Coroniti, F. V. Energetic Electrons in Jupiter's Magnetosphere, **191**, 287, 41-G1; Suppl. **27**, 261 (No. 244).
- Coroniti, F. V., Kennel, C. F., and Thorne, R. M. Stably Trapped Proton Fluxes in the Jovian Magnetosphere, **189**, 383, 24-B13.
- Couch, R. G. See Pardo et al., A Study of Nucleosynthesis during Explosive Carbon Burning, **191**, 711, 48-B1.
- Couch, Richard G., and Arnett, W. David. On the Thermal Properties of the Convective Urca Process, **194**, 537, 80-D8.
- Couch, Richard G., and Loumos, Gregory L. The Urca Process in Dense Stellar Interiors, **194**, 385, 78-G9.
- Couch, Richard G., Schmiedekamp, Ann B., and Arnett, W. David. *s*-Process Nucleosynthesis in Massive Stars: Core Helium Burning, **190**, 95, 29-A1.
- Counselman, C. C. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure"

- Phases and Visibility Amplitudes Observed with Three-Element Interferometers, **193**, 293, 67-A4.
- Cowan, R. D. See Doschek et al., Transitions $2s^2 2p^k - 2s 2p^{k+1}$ of the F I, O I, and N I Isoelectronic Sequences, **188**, 417, 15-B1.
- Cowan, R. D. See Fawcett et al., Theoretical and Experimental Study of Fe XIX to Fe XXIV Solar-Flare Spectra and Isoelectronic Spectra in Sulfur, **187**, 377, 5-E3.
- Cowan, R. D. See Feldman et al., Laser-Plasma Spectra of Highly Ionized Fluorine, **187**, 417, 5-G11.
- Cowan, R. D. See Feldman et al., Satellite Line Spectra from Laser-produced Plasmas, **192**, 213, 52-A6.
- Cowley, A. P. See Hutchings et al., Evidence for the Existence of a Massive Companion to X Persei ($= 2U 0352+30?$), **191**, L101, 49-A2.
- Cowley, A. P. See Hutchings et al., H α Emission in Cygnus X-1, **191**, 743, 48-D4.
- Cowley, A. P. See Marlborough and Cowley, A Model Envelope for the Shell Star 1 Delphini, **187**, 99, 2-A4.
- Cowley, Anne P. See Cowley et al., Element Identifications in Five Ap Stars, **194**, 343, 78-D5.
- Cowley, Charles R. See Allen and Cowley, Resolution of the Praseodymium Abundance Anomaly in the Ba II Stars, **190**, 601, 36-A7.
- Cowley, Charles R. See Hartoog et al., On the Abundance of Europium, **187**, 551, 8-C1.
- Cowley, Charles R., Hartoog, Mark R., and Cowley, Anne P. Element Identifications in Five Ap Stars, **194**, 343, 78-D5.
- Cowsik, R., and Mitteldorf, J. Turbulence-enhanced Synchrotron Radiation in the Galaxy, **189**, 51, 19-D12.
- Cox, Donald P., and Smith, Barham W. Large-Scale Effects of Supernova Remnants on the Galaxy: Generation and Maintenance of a Hot Network of Tunnels, **189**, L105, 27-C7.
- Cox, J. P. Effects of Thermal Imbalance on the Pulsational Stability of Stars Undergoing Thermal Runaways, **192**, L85, 57-G3.
- Cox, J. P. See Aizenman and Cox, Pulsational Stability of Stars in Thermal Imbalance. IV. Direct Solution of Differential Equation, **194**, 663, 83-C7.
- Cox, John P. See Davey and Cox, Pulsational Stability of Stars in Thermal Imbalance. II. An Energy Approach, **189**, 113, 20-B5.
- Cox, John P., Davey, William R., and Aizenman, Morris L. Pulsational Stability of Stars in Thermal Imbalance. III. Analysis in Terms of Absolute Variations, **191**, 439, 44-D9.
- Coyne, George V., S.J. See Kemp et al., On the Linear Polarization of GD-229, **189**, L79, 24-F6.
- Craine, Eric R. Scattering in the Shell of Eta Carinae, **191**, 105, 40-B1.
- Crampton, D. See Hutchings et al., Evidence for the Existence of a Massive Companion to X Persei ($= 2U 0352+30?$), **191**, L101, 49-A2.
- Crampton, D. See Hutchings et al., H α Emission in Cygnus X-1, **191**, 743, 48-D4.
- Crampton, David. Spectroscopic Observations of HZ Herculis, **187**, 345, 5-B13.
- Crampton, David, and Hutchings, J. B. A Spectroscopic Analysis of HZ Herculis, **191**, 483, 44-G7.
- Crandall, D. H., Dunn, G. H., Gallagher, A., Hummer, D. G., Kunsz, C. V., Leep, D., and Taylor, P. O. Rate Coefficients for Electron Excitation of the First Resonance Transition in H, Li, Na, Ca, Ca $^+$, and Ba $^+$ Calculated from Experimental Data, **191**, 789, 48-G5.
- Crofts, J. G. See Fourikis et al., A Search for Interstellar Nitroxyl (HNO), **194**, 41, 74-D8.
- Cromwell, Richard H. See Barry and Cromwell, Spectroscopic Comparison of Open Clusters. I. The Reddening, Blanketing, and Metallicity of M67, **187**, 107, 2-A11.
- Cronyn, W. M. See Cohen and Cronyn, Scintillation and Apparent Angular Diameter, **192**, 193, 51-G3.
- Crudde, Ray. See Bowyer et al., Observation of X-Ray Emission from M31, **190**, 285, 31-D5.
- Crudde, Ray. See Margon et al., A Search for a Cosmological Component of the Soft X-Ray Background in the Direction of M31, **191**, L117, 49-B3.
- Crudde, Raymond, Paresce, Francesco, Bowyer, Stuart, and Lampton, Michael. On the Opacity of the Interstellar Medium to Ultraviolet X-Rays and Extreme-Ultraviolet Radiation, **187**, 497, 7-F1.
- Cruise, A. M. See Culhane et al., Detection of Soft X-Ray Emission from PSR 0833-45, **190**, L9, 30-D13.
- Crutcher, Richard M. See Allen et al., A Search for OD in the Galactic Center, **188**, 33, 10-C5.
- Crutcher, Richard M., and Riegel, Kurt W. Optical Interstellar Line Studies of a Nearby Cold Cloud, **188**, 481, 16-C10.
- Cudaback, D. D. See Turner et al., Fine Structure in H II Regions. II, **194**, 279, 77-F1.
- Culhane, J. L. See Fabian et al., *Copernicus* X-Ray Observations of NGC 1275 and the Core of the Perseus Cluster, **189**, L59, 24-E1.
- Culhane, J. L., Cruise, A. M., Rapley, C. G., and Hawkins, F. J. Detection of Soft X-Ray Emission from PSR 0833-45, **190**, L9, 30-D13.
- Currie, D. G., Knapp, S. L., and Liewer, K. M. Four Stellar-Diameter Measurements by a New Technique: Amplitude Interferometry, **187**, 131, 2-C5.
- Cuzzi, Jeffrey N. The Nature of the Subsurface of Mercury from Microwave Observations at Several Wavelengths, **189**, 577, 26-G1.
- Czyzak, S. J. See Boeshaar et al., Spectrophotometric Observations of NGC 6543, **193**, 290, 65-G6; Suppl. **28**, 335 (No. 264).
- Czyzak, S. J. See Lee et al., Spectrophotometric Studies of Gaseous Nebulae. XXIII. The Planetary Nebula NGC 6803, **192**, 159, 51-D10.
- Czyzak, S. J., Aller, L. H., and Euwema, R. N. Forbidden-Line Excitation Data for Certain Coronal Lines, **195**, 251, 3-D6; Suppl. **28**, 465 (No. 272).
- Dahab, Richard E. A Determination of the Cooling Time and the Speed of the Surface Current of HZ Herculis, **187**, 351, 5-C7.
- Dahn, C. C. See Harrington et al., The Nearby Double Star G208-44/45, **194**, L87, 80-F12.
- Dalgarno, A. See Oppenheimer and Dalgarno, The Chemistry of Sulfur in Interstellar Clouds, **187**, 231, 4-B4.
- Dalgarno, A. See Oppenheimer and Dalgarno, The Fractional Ionization in Dense Interstellar Clouds, **192**, 29, 50-B11.
- Dalgarno, A., de Jong, T., Oppenheimer, M., and Black, J. H. Hydrogen Chloride in Dense Interstellar Clouds, **192**, L37, 53-C7.
- Dalgarno, A., and Oppenheimer, M. Chemical Heating of Interstellar Clouds, **192**, 597, 59-B13.
- Danielson, R. E. The Visible Spectrum of Uranus, **192**, L107, 58-A10.
- Danielson, R. E. See Light et al., The Nucleus of M31, **194**, 257, 77-D7.
- Danks, A. C., Lambert, D. L., and Arpigny, C. The $^{12}\text{C}/^{13}\text{C}$ Ratio in Comet Kohoutek (1973f), **194**, 745, 84-B1.
- Danziger, I. J. Helium in Southern H II Regions, **193**, 69, 63-F2.
- Davey, William R. Pulsational Stability of Stars in Thermal Imbalance. V. Eigensolutions for Quasi-adiabatic Oscillations, **194**, 687, 83-E2.
- Davey, William R. See Cox et al., Pulsational Stability of Stars in Thermal Imbalance. III. Analysis in Terms of Absolute Variations, **191**, 439, 44-D9.
- Davey, William R., and Cox, John P. Pulsational Stability of Stars in Thermal Imbalance. II. An Energy Approach, **189**, 113, 20-B5.
- Davidsen, Arthur, Malina, Roger, Smith, Harding, Spinrad, Hyron, Margon, Bruce, Mason, Keith, Hawkins, Frederick, and Sanford, Peter. Optical and X-Ray Observations of 3U 0614+09, **193**, L25, 66-B9.
- Davidsen, Arthur, and Ostriker, Jeremiah P. The Nature of Cygnus X-3: A Prototype for Old-Population Binary X-Ray Sources, **189**, 331, 23-F1.
- Davidson, Arthur, and Welch, William. Limits on Ionized Intracluster Gas in Abell 2199, **191**, L11, 42-A11.
- Davis, Cecil G. Relativistic Terms in Nonlinear Pulsation Theory, **187**, 175, 2-F4.

- Davis, J. H. See Thaddeus et al., Detection of the $J = 1 \rightarrow 0$ Rotational Transition of vibrationally Excited Silicon Monoxide, **192**, L33, 53-C3.
- Davis, J. H., Blair, G. N., Van Till, H., and Thaddeus, P. vibrationally Excited Silicon Monoxide in the Orion Nebula, **190**, L117, 37-F13.
- Davis, Marc, and Wilkinson, David T. Search for Primeval Galaxies, **192**, 251, 54-A13.
- Davis, Robert J. See Peytremann and Davis, Ultraviolet Television Data from the Orbiting Astronomical Observatory. II. Stellar Ultraviolet Colors and Interstellar Extinction, **192**, 815, 61-C12; Suppl. **28**, 211 (No. 260).
- Day, K. L., Steyer, T. R., and Huffman, D. R. A Quantitative Study of Silicate Extinction, **191**, 415, 44-B13.
- Day, Kenrick L. A Possible Identification of the 10-Micron "Silicate" Feature, **192**, L15, 53-B1.
- Dearborn, D. S. See Lambert et al., The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. II. CN and CO in Alpha Orionis, **193**, 621, 71-B4.
- Dearborn, David, and Schramm, David N. CNO Tri-cycling as an ^{17}O Enrichment Mechanism, **194**, L67, 80-E6.
- Dedic, Helena, and Tassoul, Jean-Louis. A Case of Metastability for Slowly Rotating, Supermassive Objects, **188**, 173, 11-F11.
- Deerenberg, A. J. M. See de Korte et al., Observation of Enhanced Soft X-Ray Emission from the Vicinity of the North Polar Spur, **190**, L5, 30-D7.
- DeGregoria, A. J. An Investigation of Accretion of Matter onto White Dwarfs as a Possible X-Ray Mechanism, **189**, 555, 26-E7.
- de Jong, T. See Dalgarno et al., Hydrogen Chloride in Dense Interstellar Clouds, **192**, L37, 53-C7.
- de Korte, P. A. J., Bleeker, J. A. M., Deerenberg, A. J. M., Tanaka, Y., and Yamashita, K. Observation of Enhanced Soft X-Ray Emission from the Vicinity of the North Polar Spur, **190**, L5, 30-D7.
- Delache, Philippe. A New Formulation of an Approximate Transfer Equation, **192**, 475, 56-D6.
- Demarque, P. See Prather and Demarque, Convective Overshoot Mixing in Old Open Clusters, **193**, 109, 64-A12.
- Demarque, Pierre, Mengel, John G., and Sweigart, Allen V. Rotating Solar Models with Low Neutrino Flux (Erratum), **187**, 423, 6-A4.
- Deney, C. L. See Golden et al., Rigidity Spectrum of $Z \geq 3$ Cosmic-Ray Nuclei in the Range 4 to 285 GV and a Search for Cosmic Antimatter, **192**, 747, 60-F3.
- Dent, W. A. See Kapitzky and Dent, A High-Resolution Map of the Galactic-Center Region, **188**, 27, 10-B13.
- Dent, W. A., Aller, H. D., and Olsen, E. T. The Evolution of the Radio Spectrum of Cassiopeia A, **188**, L11, 12-C12.
- Desch, M. See Mutelet et al., VLBI Observations of the Crab Nebula and the Wavelength Dependence of Interstellar Scattering, **193**, 279, 65-F9.
- Desch, Michael D., and Carr, Thomas D. Dekametric and Hectometric Observations of Jupiter from the RAE-1 Satellite, **194**, L57, 76-G1.
- de Silva, L. N. K. On Gravitational-Lens Quasars, **189**, 177, 22-A13.
- Despain, Keith H. See Christy-Sackmann and Despain, An Interpretation of the Puzzling Observations of FG Sagittae, **189**, 523, 26-C4.
- Despain, Keith H. See Sackmann et al., Carbon and Eruptive Stars: Surface Enrichment of Lithium, Carbon, Nitrogen, and ^{13}C by Deep Mixing, **187**, 555, 8-C5.
- Deupree, R. G. On the Beat Phenomenon in the Beta Cephei Stars, **190**, 631, 36-D1.
- Deupree, Robert G. Nonlinear, Adiabatic, Nonradial Stellar pulsation: Calculations and Applications, **194**, 393, 79-A3.
- Deutsch, Armin J. See Keenan et al., Revised Catalog of Spectra of Mira Variables of Types Me and Se, **193**, 289, 65-G5; Suppl. **28**, 271 (No. 262).
- de Vaucouleurs, A. See de Vaucouleurs et al., Further Evidence for an Explosive Event in the Peculiar Galaxy NGC 1569, **194**, L119, 84-D2.
- de Vaucouleurs, G. See Freeman and de Vaucouleurs, An Interpretation of Ring Galaxies and the Properties of Intergalactic Gas Clouds, **194**, 569, 82-C10.
- de Vaucouleurs, G., de Vaucouleurs, A., and Pence, W. Further Evidence for an Explosive Event in the Peculiar Galaxy NGC 1569, **194**, L119, 84-D2.
- De Young, David S., and Roberts, Morton S. The Stability of Galaxy Clusters: Neutral Hydrogen Observations, **189**, 1, 19-A5.
- Dicke, R. H. Faculae and the Solar Oblateness. II, **190**, 187, 29-G4.
- Dicke, R. H., and Goldenberg, H. Mark. The Oblateness of the Sun, **190**, 507, 33-E9; Suppl. **27**, 131 (No. 241).
- Dickel, John R. Do Supernova Remnants Provide the Cosmic-Ray Electrons?, **193**, 755, 72-E1.
- Dickinson, Dale F. See Lada et al., Discovery and CO Observations of a New Molecular Source near M17, **189**, L35, 21-B4.
- Dickinson, Dale F., Frogel, Jay A., and Persson, S. Eric. CO Emission Associated with Sharpless H II Regions, **192**, 347, 55-B1.
- Dickinson, Dale F., Kojoian, Gabriel, and Strom, Stephen E. A Strong Water Maser Associated with a Herbig-Haro Object, **194**, L93, 80-G4.
- Disney, M. J. Parkes 0548-22: A BL Lacertae Object in a Cluster of Galaxies, **193**, L103, 72-E11.
- Disney, M. J., Peterson, B. A., and Rodgers, A. W. The Redshift and Composite Nature of AP Librae (PKS 1514-24), **194**, L79, 80-F4.
- Doherty, L. H. See Balick et al., The Structure of the Orion Nebula. I. Observations of the C 85α Recombination Line, **188**, 45, 10-D3.
- Doherty, L. H., MacLeod, J. M., and Oka, T. Detection of the 10.464-GHz Transition of Interstellar Thioformaldehyde, **192**, L157, 62-A9.
- Doherty, L. R., McNall, J. F., and Holm, A. V. Ultraviolet Photometry from the Orbiting Astronomical Observatory. XI. The 1971 Eclipse of 32 Cygni, **187**, 521, 8-A1.
- Dolan, J. F. See Sanduleak and Dolan, Southern Radio Sources Possibly Identified with X-Ray Sources, **187**, L73, 6-C10.
- Dolan, Joseph F. See Hartmann and Dolan, Stellar Molecular Abundances. II. The Violet Depression in Carbon Stars, **187**, 151, 2-D11.
- Donivan, F. F., Jr., Carr, T. D., and Omer, G. C., Jr. Radio Observations of Two Clusters of Galaxies, **187**, 11, 1-A11.
- Doschek, G. A. See Feldman et al., Laser-Plasma Spectra of Highly Ionized Fluorine, **187**, 417, 5-G11.
- Doschek, G. A. See Feldman et al., Satellite Line Spectra from Laser-produced Plasmas, **192**, 213, 52-A6.
- Doschek, G. A., Behring, W. E., and Feldman, U. The Widths of the Solar He I and He II Lines at 584, 537, and 304 Å, **190**, L141, 38-A5.
- Doschek, G. A., Feldman, U., Cowan, R. D., and Cohen, Leonard. Transitions $2s^2 2p_k - 2s 2p_{k+1}$ of the F I, O I, and N I Isoelectronic Sequences, **188**, 417, 15-B1.
- Downes, D., and Wilson, T. L. Formaldehyde Line Emission at 4.8 GHz near NGC 7538, **191**, L77, 46-C5.
- Doxsey, R. See Rappaport et al., Possible Detection of Very Soft X-Rays from SS Cygni, **187**, L5, 3-B5.
- Doxsey, R. See Rappaport et al., X-Ray Structure of the Cygnus Loop, **194**, 329, 78-C3.
- Doxsey, R. See Spada et al., Limits on Rapid X-Ray Pulsing in X-Ray Binaries, **190**, L113, 37-F10.
- Drake, G. W. F. Electron-Hydrogen Photoattachment as a Source of Ultraviolet Absorption, **189**, 161, 20-E9.
- Dufour, R. J. See Bohuski et al., Nebular Photometry with an Echelle Spectrometer: [O III] Line Ratios in NGC 1976 and NGC 6853, **188**, 529, 16-F14.
- Dukes, Robert J., Jr. The Beta Cephei Nature of Spica, **192**, 81, 50-F10.
- Dultzin, D. See Bisiacchi et al., On the Interpretation of the He II $\lambda 4686$ Emission Line in HDE 226868 (Cygnus X-1), **190**, L59, 33-F11.

- Dunkin, D. B. See Fehsenfeld et al., On the Association of C⁺ and COH⁺ with H₂, 188, 43, 10-D1.
- Dunn, G. H. See Crandall et al., Rate Coefficients for Electron Excitation of the First Resonance Transition in H, Li, Na, Ca, Ca⁺, and Ba⁺ Calculated from Experimental Data, 191, 789, 48-G5.
- Dupree, A. K. Carbon Recombination Lines and Interstellar Hydrogen Clouds, 187, 25, 1-B9.
- Durney, Bernard R. On the Sun's Differential Rotation: Its Maintenance by Large-scale Meridional Motions in the Convection Zone, 190, 211, 30-A14.
- Dworetsky, Michael M. Rotational Velocities of AO Stars, 192, 574, 57-D6; Suppl. 28, 101 (No. 256).
- Dyck, H. M., and Beichman, C. A. Observations of Infrared Polarization in the Orion Nebula, 194, 57, 74-E9.
- Dyck, H. M., Capps, R. W., and Beichman, C. A. Infrared Polarization of the Galactic Nucleus, 188, L103, 18-D13.
- Dyck, H. M., Lockwood, G. W., and Capps, R. W. Infrared Fluxes, Spectral Types, and Temperatures for Very Cool Stars, 189, 89, 19-G7.
- Dyer, C. C., and Roeder, R. C. Observations in Locally Inhomogeneous Cosmological Models, 189, 167, 22-A4.
- Dykla, John J. See Hwang and Dykla, Can a Neutron Star Be Compressed into a Black Hole?, 192, L141, 61-G8.
- Dymanson, A. See Meerts and Dymanson, The Hyperfine A-Doubling Spectrum of Sulfur Hydride in the ²II^{3/2} State, 187, L45, 3-D12.
- Dyson, F. J. See Bahcall et al., Multiple Star Systems and X-Ray Sources, 189, L17, 21-A1.
- Dyson, H. B. See Wilson et al., Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters, 191, 357, 43-E11.
- Eardley, Douglas M. See Lightman and Eardley, Black Holes in Binary Systems: Instability of Disk Accretion, 187, L1, 3-B2.
- Earl, James A. Coherent Propagation of Charged-Particle Bunches in Random Magnetic Fields, 188, 379, 14-F1.
- Earl, James A. The Diffusive Idealization of Charged-Particle Transport in Random Magnetic Fields, 193, 231, 65-C4.
- Eddy, J. A. See MacQueen et al., The Outer Solar Corona as Observed from Skylab: Preliminary Results, 187, L85, 6-D7.
- Edwards, Terry W. See Harrison and Edwards, Low-Temperature Photoneutron Sources for Stellar Nucleosynthesis, 187, 303, 4-G2.
- Edwards, Terry W., and Harrison, Thomas G. A Photoneutron Mechanism for the Production of Technetium-99 in the Interior of Evolved Stars, 187, 313, 4-G11.
- Eggen, O. J. NGC 2287 and the Pleiades Group, 188, 59, 10-E3.
- Ehman, J. R. See Andrew et al., Spectra of Some Ohio Radio Sources: List IV (Erratum), 189, 165, 20-E12.
- Eitter, J. J., and Beavers, W. I. Lunar Occultation Summary. I., 194, 213, 76-B11; Suppl. 28, 405 (No. 269).
- Elander, N. See Brzozowski et al., On the Interstellar Abundance of the CH⁺ Radical, 193, 741, 72-D1.
- Elbert, Donna D. See Chandrasekhar and Elbert, The Deformed Figures of the Dedeckin Ellipsoids in the Post-Newtonian Approximation to General Relativity, 192, 731, 60-E1.
- Elias, J. H. See Harvey et al., Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission, 189, L87, 24-F13.
- Elias, J. H. See Werner et al., 1-Millimeter Continuum Radiation from Orion Molecular Cloud 2, 192, L31, 53-C1.
- Elitzur, Moshe. Index of Refraction of Plasma in Motion, 190, 673, 36-G4.
- Eller, E. L. See Trombka et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. II. X-Ray Time Profile and Source Location, 194, L27, 76-E2.
- Elliot, J. L., Wasserman, L. H., Veverka, J., Sagan, Carl, and Liller, W. The Occultation of Beta Scorpii by Jupiter. II. The Hydrogen-Helium Abundance in the Jovian Atmosphere, 190, 719, 37-C6.
- Elliot, James L., and Shapiro, Stuart L. On the Variability of the Compact Nonthermal Sources, 192, L3, 53-A4.
- Ellis, David. See Stoner et al., The Interpretation of Broad Emission Lines in High-Redshift QSOs, 191, 291, 43-A4.
- Encrenaz, P. J. A New Source of Intense Molecular Emission in the Rho Ophiuchi Complex, 189, L135, 27-E7.
- Encrenaz, P. J. See Wannier et al., Isotopic Abundances and Line Formation in the Orion Nebula, 190, L77, 34-A1.
- Endean, V. G. "Lorentz Force-free" Pulsar Rotating Fields, 187, 359, 5-C14.
- Epstein, E. E. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, 191, 51, 39-E1.
- Epstein, E. E. See Wilson et al., Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters, 191, 357, 43-E11.
- Epstein, Eugene E. See Fogarty et al., NGC 1068: Possible 3-Millimeter Radio Variability, 191, 305, 43-B4.
- Epstein, Richard I., Arnett, W. David, and Schramm, David N. Can Supernovae Produce Deuterium?, 190, L13, 30-E3.
- Erman, P. See Brzozowski et al., On the Interstellar Abundance of the CH⁺ Radical, 193, 741, 72-D1.
- Erman, Peter, Brzozowski, J., and Smith, Wm. Hayden. Oscillator Strengths for Neutral Sodium and the Interstellar Sodium Abundance in Zeta Ophiuchi, 192, 59, 50-D11.
- Esteva, J. M. See Mehrlam and Esteva, Autoionization Spectra of Beryllium (Be I and Be II) in the 110- to 140-eV Energy Range, 188, 191, 12-A1.
- Esteva, J. M., and Mehlman, G. Autoionization Spectra of Magnesium (Mg I, Mg II, and Mg III) in the 50- to 110-eV Energy Range, 193, 747, 72-D7.
- Etchegorry, R. D. See Wilson et al., Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters, 191, 357, 43-E11.
- Euwema, R. N. See Czyzak et al., Forbidden-Line Excitation Data for Certain Coronal Lines, 195, 251, 3-D6; Suppl. 28, 465 (No. 272).
- Evans, N. J., II. See Harvey et al., Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission, 189, L87, 24-F13.
- Evans, N. J., II. See Zuckerman and Evans, Models of Massive Molecular Clouds, 192, L149, 62-A1.
- Eviatar, A. See Mekler and Eviatar, Spectroscopic Observations of Io, 193, L151, 73-B5.
- Ezer, D. See Carson et al., Solar Neutrinos and the Influence of Radiative Opacities on Solar Models, 194, 743, 84-A12.
- Fabian, A. C., Zarnecki, J. C., Culhane, J. L., Hawkins, F. J., Peacock, A., Pounds, K. A., and Parkinson, J. H. *Copernicus* X-Ray Observations of NGC 1275 and the Core of the Perseus Cluster, 189, L59, 24-E2.
- Fahlmann, G. See Hutchings et al., H_α Emission in Cygnus X-1, 191, 743, 48-D4.
- Fairbairn, A. R., Wolnik, S. J., and Berthel, R. O. Oscillator Strengths in the TiO Alpha-Band System, 193, 273, 65-F3.
- Falk, Alfred E., and Wehlau, William H. Harmonic Analysis of the Line Profiles of an Oblique Rotator, 192, 409, 55-F13.
- Fanale, Fraser P. See Matson et al., Sodium D-Line Emission from Io: Sputtering and Resonant Scattering Hypothesis, 192, L43, 53-D1.
- Faraggiana, R. See Boesgaard et al., The Abundance of Boron and Beryllium in Alpha Lyrae, 194, L143, 84-F1.
- Fast, H., Poeckert, R., and Auman, J. R. Raman Scattering from H₂ in Jupiter, 187, 403, 5-F13.
- Faulkner, D. J. See Gingold and Faulkner, Thermal Pulses in Helium Shell-burning Stars. III., 188, 145, 11-D11.
- Fawcett, B. C., Cowan, R. D., and Hayes, R. W. A Theoretical and Experimental Study of Fe XIX to Fe XXIV Solar-Flare Spectra and Isoelectronic Spectra in Sulfur, 187, 377, 5-E3.
- Fawley, William M., and Cohen, Martin. The Open Cluster NGC 7419 and Its M7 Supergiant IRC+60 375, 193, 367, 67-F3.
- Fay, Theodore D., Jr. Are 2-Micron Absorptions and 11-Micron Emissions of M Stars Related?, 188, 553, 17-A12.
- Fay, Theodore D., Jr. On the C₂, CN, and CO Indices of Carbon

- Stars, **190**, 597, 36-A4.
- Fazio, G. G., Kleinmann, D. E., Noyes, R. W., Wright, E. L., Zeilik, M., II, and Low, F. J. A High-Resolution Map of the Orion Nebula Region at Far-Infrared Wavelengths, **192**, L23, 53-B8.
- Fazio, G. G. See Grindlay and Fazio, Cosmic Gamma-Ray Bursts from Relativistic Dust Grains, **187**, L93, 9-D2.
- Fehsenfeld, F. C., Dunkin, D. B., and Ferguson, E. E. On the Association of C⁺ and COH⁺ with H₂, **188**, 43, 10-D1.
- Feldman, P. A. See Marsh et al., A Model for the Radio Bursts of Cygnus X-3, **192**, 697, 60-B9.
- Feldman, U. See Doschek et al., Transitions 2s²p_k-2s2p_{k+1} of the F I, O I, and N I Isoelectronic Sequences, **188**, 417, 15-B1.
- Feldman U. See Doschek et al., The Widths of the Solar He I and He II Lines at 584, 537, and 304 Å, **190**, L141, 38-A5.
- Feldman, U., and Behring, W. E. Solar Coronal Line Profiles in the Extreme-Ultraviolet, **189**, L45, 21-C1.
- Feldman, U., Doschek, G. A., Nagel, D. J., Behring, W. E., and Cowan, R. D. Laser-Plasma Spectra of Highly Ionized Fluorine, **187**, 417, 5-G11.
- Feldman, U., Doschek, G. A., Nagel, D. J., Cowan, R. D., and Whitlock, R. R. Satellite Line Spectra from Laser-produced Plasmas, **192**, 213, 52-A6.
- Felten, James E., and Gould, Robert J. The Effect of Repeated Compton Scatterings on the Diffuse X-Ray Background, **194**, L39, 76-E12.
- Ferguson, D. C. See Cocke and Ferguson, Color-Difference Photometry of the Crab Nebula Pulsar and the Rotating Relativistic Vector Model, **194**, 725, 83-G10.
- Ferguson, D. C., Cocke, W. J., and Gehrels, T. Optical Polarization of the Crab Nebula Pulsar. III. New Observations, Predictions, and the Possibility of Variability, **190**, 375, 32-C10.
- Ferguson, E. E. See Fehsenfeld et al., On the Association of C⁺ and COH⁺ with H₂, **188**, 43, 10-D1.
- Fichtel, C. E. See Bignami and Fichtel, Galactic Arm Structure and Gamma-Ray Astronomy, **189**, L65, 24-E6.
- Fichtel, C. E. See Thompson et al., SAS-2 Observations of the High-Energy Gamma Radiation from the Vela Region, **190**, L51, 33-F4.
- Field, George B. Interstellar Abundances: Gas and Dust, **187**, 453, 7-C3.
- Fink, Uwe, Larson, Harold P., and Poppen, Richard F. A New Upper Limit for an Atmosphere of CO₂, CO on Mercury, **187**, 407, 5-G2.
- Finzi, Arrigo. Solar Neutrinos and the Behavior of the Fermi Coupling Constant, **189**, 157, 20-E5.
- Fireman, E. L. Interstellar Absorption of X-Rays, **187**, 57, 1-D13.
- Firmani, C. See Bisiochi et al., On the Interpretation of the He II λ4686 Emission Line in HDE 226868 (Cygnus X-1), **190**, L59, 33-F11.
- Fisher, J. R. See Backer and Fisher, Pulsar Flux-Density Spectra, **189**, 137, 20-D1.
- Fisk, L. A., Goldstein, M. L., Klimas, A. J., and Sandri, G. The Fokker-Planck Coefficient for Pitch-Angle Scattering of Cosmic Rays, **190**, 417, 32-F7.
- Fisk, L. A., Kozlovsky, B., and Ramaty, R. An Interpretation of the Observed Oxygen and Nitrogen Enhancements in Low-Energy Cosmic Rays, **190**, L35, 30-F14.
- FitzGerald, M. Pim, and Pilavaki, Andrea. V1016 Cygni: Spectral Observations 1969-1973, **192**, 575, 57-D7; Suppl. **28**, 147 (No. 258).
- Fix, John D., and Alexander, David R. Solid Particles and Stellar Mass Loss, **188**, L91, 18-D3.
- Fleischer, R. L., Hart, H. R., Jr., and Renshaw, A. Composition of Heavy Cosmic Rays from 25 to 180 MeV per Atomic Mass Unit, **193**, 575, 70-F2.
- Flesch, T. R., and Oliver, J. P. Three-Color Photometry of the Flare Star EV Lacertae, **189**, L127, 27-E1.
- Flowers, Elliott. Finite Nuclear Size Effects on Neutrino-Pair Bremsstrahlung in Neutron Stars, **190**, 381, 32-D2.
- Fogarty, William G., Epstein, Eugene E., and Mottmann, John. NGC 1068: Possible 3-Millimeter Radio Variability, **191**, 305, 43-B4.
- Fontaine, G., Van Horn, H. M., Böhm, K.-H., and Grenfell, T. C. The Effects of Differences in Composition, Equation of State, and Mixing Length upon the Structure of White-Dwarf Convection Zones, **193**, 205, 65-A9.
- Forman, M. A., Jokipii, J. R., and Owens, A. J. Cosmic-Ray Streaming Perpendicular to the Main Magnetic Field, **192**, 535, 57-A10.
- Forman, W. See Jones et al., Observations of Circinus X-1 from Uhuru, **191**, L71, 46-B13.
- Forman, W., Giacconi, R., Jones, C., Schreier, E., and Tananbaum, H. Uhuru Observations of Short-Time-Scale Variations of the Crab, **193**, L67, 69-C12.
- Forrest, W. J. See Gillett and Forrest, The 7.5- to 13.5-Micron Spectrum of Saturn, **187**, L37, 3-D6.
- Forrester, William T. See McClure et al., The Old Open Cluster NGC 2420, **189**, 409, 25-A14.
- Fort, D. N. See Bell and Fort, A Quantitative Alternative to the Cosmological Hypothesis for Quasars (Erratum), **191**, 795, 48-G10.
- Fossat, Eric, Ricort, Gilbert, Aime, Claude, and Roddier, François. Evidence for Large-Scale Oscillations of the Solar Photosphere, **193**, L97, 69-E13.
- Foukal, P. V. See Huber et al., Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from Skylab, **194**, L115, 81-B2.
- Foukal, P. V. See Reeves et al., Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount, **188**, L27, 12-D11.
- Foukal, P. V., Huber, M. C. E., Noyes, R. W., Reeves, E. M., Schmahl, E. J., Timothy, J. G., Vernazza, J. E., and Withbroe, G. L. Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount, **193**, L143, 73-A10.
- Fourikis, N., Sinclair, M. W., Brown, R. D., Crofts, J. G., and Godfrey, P. D. A Search for Interstellar Nitroxyl (HNO), **194**, 41, 74-D8.
- Fourikis, N., Takagi, K., and Morimoto, M. Detection of Interstellar Methylamine by its 202 110 Å-State Transition, **191**, L139, 49-C8.
- Fowler, John W. A Line-blanketed Model Stellar Atmosphere of Sirius, **188**, 295, 13-G3.
- Fowler, William A. See Howard et al., Measurement and Theoretical Analysis of Some Reaction Rates of Interest in Silicon Burning, **188**, 131, 11-C13.
- Freeman, K. C. See Illingworth and Freeman, The Mass of the Globular Cluster NGC 6388, **188**, L83, 18-C10.
- Freeman, K. C., and de Vaucouleurs, G. An Interpretation of Ring Galaxies and the Properties of Intergalactic Gas Clouds, **194**, 569, 82-C10.
- Fricke, Klaus J. Dynamical Phases of Rotating Supermassive Stars, **189**, 535, 26-D1.
- Friedlander, M. W., Goebel, J. H., and Joseph, R. D. Detection of New Celestial Objects at Far-Infrared Wavelengths, **194**, L5, 76-C6.
- Fritts, M. J. See Roughton et al., Stellar Reaction Rates for Proton Capture on ²⁸Si, ⁵⁰Cr, ⁵⁴Fe, ⁵⁸Ni, ⁶⁰Ni, and ⁶¹Ni, **193**, 187, 64-G7.
- Fritts, M. J. See Roughton et al., Thick-Target Measurement of the (p, γ) Stellar Reaction Rates of the Nuclides ¹²C, ²⁸Si, ⁴⁸Ti, ⁴⁷Ti, and ⁵⁶Fe, **188**, 595, 17-D10.
- Frogel, J. A. See Becklin et al., The H II Region G333.6-0.2, a Very Powerful 1-20 Micron Source (Erratum), **193**, L153, 73-B7.
- Frogel, J. A. See Becklin et al., Infrared Emission from the Southern H II Region H2-3, **187**, 487, 7-E6.
- Frogel, Jay A. See Dickinson et al., CO Emission Associated with Sharpless H II Regions, **192**, 347, 55-B1.
- Frogel, Jay A. See Persson and Frogel, Spectrophotometric Observations of the Compact H II Region K3-50 and of NGC 6857, **188**, 523, 16-F9.

- Frogel, Jay A. See Schild et al., The Nature of Infrared Excesses in Extreme Be Stars, **190**, 73, 28-F7.
- Frogel, Jay A., and Persson, S. Eric. Compact Infrared Sources Associated with Southern H II Regions, **192**, 351, 55-B4.
- Frost, Stewart A. See Conti and Frost, Variations of the Emission Line Profiles in the O-type Star Lambda Cephei, **190**, L137, 38-A1.
- Fu, K. Y. The Space-Time of Axisymmetric Gravitating Masses, **190**, 411, 32-F2.
- Gaines, Linda, Casleton, K. H., and Kukolich, S. G. Beam Maser Measurements of CH₃OH Rotational Transitions, **191**, L99, 46-E1.
- Gallagher, A. See Crandall et al., Rate Coefficients for Electron Excitation of the First Resonance Transition in H, Li, Na, Ca, Ca⁺, and Ba⁺ Calculated from Experimental Data, **191**, 789, 48-G5.
- Gallagher, J. S., and Holm, A. V. Ultraviolet Detection of the Nova Variables V603 Aquilae and RR Pictoris, **189**, L123, 27-D10.
- Gallagher, John S., III. See Holm and Gallagher, Ultraviolet Detection of the Dwarf Nova SS Cygni, **192**, 425, 56-A1.
- Gallagher, John S., III, and Code, Arthur D. Ultraviolet Photometry from the Orbiting Astronomical Observatory. X. Nova FH Serpentis 1970, **189**, 303, 23-D1.
- Gammon, R. H. See Balick et al., The Structure of the Orion Nebula. I. Observations of the C 85 α Recombination Line, **188**, 45, 10-D3.
- Gammon, R. H. See Brown et al., The Nature and Distribution of Carbon Recombination-Line Emission in the Rho Ophiuchi Dark Cloud, **192**, 607, 59-C8.
- Gardner, John. See Chevalier and Gardner, The Evolution of Supernova Remnants. II. Models of an Explosion in a Plane-stratified Medium, **192**, 457, 56-C4.
- Garmire, G. See Moore et al., An Upper Limit on Soft X-Ray Pulsations from the Pulsar PSR 0833-45, **189**, L117, 27-D4.
- Garrison, Robert F. See Keenan et al., Revised Catalog of Spectra of Mira Variables of Types Me and Se, **193**, 289, 65-G5; Suppl. **28**, 271 (No. 262).
- Gatewood, G. See Beardsley et al., A Study of an Early Flare, Radial Velocities, and Parallax Residuals for Possible Orbital Motion of HD 103095 (Groomebridge 1830), **194**, 637, 83-A8.
- Gatley, I. See Harvey et al., Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission, **189**, L87, 24-F13.
- Gatley, I., Becklin, E. E., Matthews, K., Neugebauer, G., Penston, M. V., and Scoville, N. A New Infrared Complex and Molecular Cloud in Orion, **191**, L121, 49-B6.
- Gatley, I., Kieffer, H., Miner, E., and Neugebauer, G. Infared Observations of Phobos from *Mariner 9*, **190**, 497, 33-E2.
- Gearhart, M. R. See Andrew et al., Spectra of Some Ohio Radio Sources: List IV (Erratum), **189**, 165, 20-E12.
- Geballe, T. R. See Rank et al., Detection of ¹⁷O in IRC+10216, **187**, L111, 9-E3.
- Geballe, T. R., and Townes, C. H. Infrared Pumping Processes for SiO Masers, **191**, L37, 42-C10.
- Gebbie, K. B., and Steinitz, R. On Spatial Variations in the Intensity of Chromospheric H α , **188**, 399, 14-G6.
- Gehrels, T. See Ferguson et al., Optical Polarization of the Crab Nebula Pulsar. III. New Observations, Predictions, and the Possibility of Variability, **190**, 375, 32-C10.
- Gehr, R. D. See Hackwell and Gehrz, Infrared Photometry of High-Luminosity Supergiants Earlier than M and the Interstellar Extinction Law, **194**, 49, 74-E2.
- Gehr, R. D. See Hackwell et al., Infrared Photometry of Wolf-Rayet Stars from 2.3 to 23 Microns, **192**, 383, 55-D11.
- Gehr, R. D., and Hackwell, J. A. Circumstellar Dust Emission from WC9 Stars, **194**, 619, 82-G4.
- Gehr, R. D., and Hackwell, J. A. New Infrared Measurements of W Virginis Stars, **193**, 385, 67-G7.
- Gehr, R. D., Hackwell, J. A., and Jones, T. W. Infrared Observations of Be Stars from 2.3 to 19.5 Microns, **191**, 675, 47-F8.
- Gehr, Robert D. See Hackwell et al., Infrared Observations of BD-10°4662, **192**, L79, 57-F11.
- Gerola, H. See Kafatos et al., Ionization of Carbon and Nitrogen in the Intercloud Medium, **187**, L113, 9-E5.
- Gerola, Humberto, Kafatos, Minas, and McCray, Richard. Statistical Time-dependent Model for the Interstellar Gas, **189**, 55, 19-E1.
- Gerola, Humberto, Linsky, Jeffrey L., Shine, Richard, McClintock, W., Henry, R. C., and Moos, H. W. Evidence for a Corona of Beta Geminorum, **193**, L107, 72-F1.
- Gerry, M. C. L. See Hocking et al., The Dipole Moment of Isocyanic Acid, HNCO, and Its Astrophysical Consequences, **187**, L89, 6-D13.
- Gerver, Michael J. Effect of Faraday Rotation on the Circular Polarization of the Crab Nebula, **189**, 249, 22-F13.
- Gezari, D. Y. See Labeyrie et al., Speckle Interferometry. III. High-Resolution Measurements of Twelve Close Binary Systems, **194**, L147, 84-F5.
- Gezari, D. Y. See Werner et al., 1-Millimeter Continuum Radiation from Orion Molecular Cloud 2, **192**, L31, 53-C1.
- Gezari, D. Y., Joyce, R. R., Righini, G., and Simon, M. 350-Micron Mapping of the Orion Molecular Cloud, **191**, L33, 42-C7.
- Giacconi, R. See Brinkman et al., Correlation Analysis of X-Ray Emission from Cygnus X-1, **188**, 603, 17-E3.
- Giacconi, R. See Forman et al., Uhuru Observations of Short-Time-Scale Variations of the Crab, **193**, L67, 69-C12.
- Giacconi, R. See Holt et al., On the Nature of the Unidentified High-Latitude Uhuru Sources, **188**, L97, 18-D8.
- Giacconi, R. See Jones et al., Observations of Circinus X-1 from Uhuru, **191**, L71, 46-B13.
- Giacconi, R., Murray, S., Gursky, H., Kellogg, E., Schreier, E., Matilsky, T., Koch, D., and Tananbaum, H. The Third Uhuru Catalog of X-Ray Sources, **188**, 667, 18-B12; Suppl. **27**, 37 (No. 237).
- Gibson, James. See McClure et al., The Old Open Cluster NGC 2420, **189**, 409, 25-A14.
- Giersch, Peter J. The Differential Rotation of the Solar Surface, **190**, 199, 30-A2.
- Giguere, P. T. See Snyder et al., Radio Detection of Interstellar Dimethyl Ether, **191**, L79, 46-C7.
- Gilbert, G. See Strittmatter et al., Spectroscopic Observations of Objects Identified with Radio Sources, **190**, 509, 35-A4.
- Gillet, F. C. See Stein et al., Observations of the Infrared Radiation from the Nuclei of NGC 1068 and NGC 4151, **187**, 213, 4-A3.
- Gillet, F. C., and Forrest, W. J. The 7.5- to 13.5-Micron Spectrum of Saturn, **187**, L37, 3-D6.
- Gilman, D. See Metzger et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. I. Temporal Variability and Energy Spectrum, **194**, L19, 76-D9.
- Gilman, D. See Trombka et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. II. X-Ray Time Profile and Source Location, **194**, L27, 76-E2.
- Gilman, Robert C. Free-free and Free-bound Emission in Low-Surface-Gravity Stars, **188**, 87, 10-G13.
- Gilman, Robert C. Planck Mean Cross-Sections for Four Fourier Materials, **194**, 213, 76-B11; Suppl. **28**, 397 (No. 268).
- Gingold, R. A., and Faulkner, D. J. Thermal Pulses in Helium Shell-burning Stars. III., **188**, 145, 11-D11.
- Gingold, Robert A. Asymptotic Giant-Branch Evolution of a 0.6 M \odot Star, **193**, 177, 64-F11.
- Giuli, R. T. See Moss and Giuli, Monte Carlo Analysis of the Solar-Wind Modulation of Galactic C-N-O at Solar Maximum, **192**, 753, 60-F8.
- Glaspey, J. W. See Hutchings et al., H α Emission in Cygnus X-1, **191**, 743, 48-D4.
- Glassgold, A. E., and Langer, William D. Model Calculations for Diffuse Molecular Clouds, **193**, 73, 63-F5.
- Goad, Jean W. Kinematic Phenomena in the Nuclear Region of M81, **311**, 54-F2.
- Godfrey, P. D. See Fourikis et al., A Search for Interstellar Nitroxyl (HNO), **194**, 41, 74-D8.

- Goebel, J. H. See Friedlander et al., Detection of New Celestial Objects at Far-Infrared Wavelengths, **194**, L5, 76-C6.
- Goguen, J. See Noland et al., New Evidence for the Variability of Titan, **194**, L157, 84-G2.
- Goldberg, Leo. Research with Solar Satellites, **191**, I, 39-A4.
- Golden, R. L., Adams, J. H., Jr., Deney, C. L., Badhwar, G. D., Marar, T. M. K., Heckman, H. H., and Lindstrom, P. J. Rigidity Spectrum of $Z \geq 3$ Cosmic-Ray Nuclei in the Range 4 to 285 GV and a Search for Cosmic Antimatter, **192**, 747, 60-F3.
- Goldenberg, H. Mark. See Dickie and Goldenberg, The Oblateness of the Sun, **190**, 507, 33-E9; Suppl. **27**, 131 (No. 241).
- Goldreich, Peter, and Kwan, John. Astrophysical Masers. IV. Line Widths, **190**, 27, 28-C1.
- Goldreich, Peter, and Kwan, John. Astrophysical Masers. V. Pump Mechanisms for H_2O Masers, **191**, 93, 40-A4.
- Goldreich, Peter, and Kwan, John. Molecular Clouds, **189**, 441, 25-D7.
- Goldsmith, Donald. See Wallerstein and Goldsmith, The Interstellar Abundance of Titanium, **187**, 237, 4-B9.
- Goldsmith, S., Oren, L., and Cohen, Leonard. The Spectra of S XIII and S XIV in the Region 25-40 Å, **188**, 197, 12-A9.
- Goldstein, M. L. See Fisk et al., The Fokker-Planck Coefficient for Pitch-Angle Scattering of Cosmic Rays, **190**, 417, 32-F7.
- Goldstein, Melvyn L. See Papadopoulos et al., Stabilization of Electron Streams in Type III Solar Radio Bursts, **190**, 175, 29-F7.
- Golub, L., Krieger, A. S., Silk, J. K., Timothy, A. F., and Vaiana, G. S. Solar X-Ray Bright Points, **189**, L93, 24-G5.
- Gómez-González, J. See Brown and Gómez-González, The He^+/H^+ Ratio in Dark Clouds, **188**, 475, 16-C4.
- Gordon, Courtney P. See Gordon et al., Radio Recombination Lines at a Wavelength of 78 Centimeters, **192**, 337, 55-A4.
- Gordon, Kurtiss J., Gordon, Courtney P., and Lockman, Felix J. Radio Recombination Lines at a Wavelength of 78 Centimeters, **192**, 337, 55-A4.
- Gorenstein, P. See Trombka et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. II. X-Ray Time Profile and Source Location, **194**, L27, 76-E2.
- Gorenstein, Paul, Harnden, Frank R., Jr., and Tucker, Wallace H. The X-Ray Spectra of the Vela and Puppis Supernova Remnants and the Shock-Wave Model of Supernova Remnants, **192**, 661, 59-G4.
- Gosling, J. T. See MacQueen et al., The Outer Solar Corona as Observed from *Skylab*: Preliminary Results, **187**, L85, 6-D7.
- Goss, W. M. See Johansson et al., OH Observations near the Reflection Nebulae NGC 2068 and NGC 2071, **189**, 455, 25-E6.
- Gott, J. Richard, III. A Time-symmetric, Matter, Antimatter, Tachyon Cosmology, **187**, I, 1-A3.
- Gott, J. Richard, III, and Gunn, James E. The Double Quasar 1548+115a, b as a Gravitational Lens, **190**, L105, 37-F3.
- Gott, J. Richard, III, Gunn, James E., Schramm, David N., and Tinsley, Beatrice M. An Unbound Universe?, **194**, 543, 82-A4.
- Gottlieb, C. A. See Lada et al., Molecular Studies of Two Dark Nebulae Associated with Herbig-Haro Objects, **194**, 609, 82-F6.
- Gottlieb, C. A., and Ball, John A. Interstellar Sulfur Monoxide (Erratum), **187**, L47, 3-D14.
- Gould, Robert J. See Felten and Gould, The Effect of Repeated Compton Scatterings on the Diffuse X-Ray Background, **194**, L39, 76-E12.
- Grader, R. See Hill et al., An Unusual X-Ray Source in Scutum, **189**, L69, 24-E9.
- Grandi, Steven A., Hintzen, Paul M. N. O., Jensen, Eric B., Rydgren, Anthony E., Scott, John S., Stickney, Philip M., Whelan, John A. J., and Worden, Simon P. The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis, **190**, 365, 32-C1.
- Grasdalen, G. L. An Infrared Study of NGC 2024, **193**, 373, 67-F12.
- Grasdalen, G. L. See Kinman et al., Optical and Infrared Observations of the Jet of M87, **194**, L1, 76-C2.
- Grasdalen, G. L. See Pipher et al., Infrared Observations of the Radio Source G30.8-0.0 in the W43 Complex, **193**, 283, 65-F13.
- Grasdalen, G. L. See Strom et al., Infrared Observations of H II Regions in External Galaxies, **193**, L7, 66-A8.
- Grasdalen, G. L. See Strom et al., An Infrared Source Associated with a Herbig-Haro Object, **187**, 83, I-F12.
- Grasdalen, G. L. See Strom et al., Infrared and Optical Observations of Herbig-Haro Objects, **191**, 111, 40-B6.
- Gray, David F., and Marlborough, J. M. Photoelectric Profile Measurements of $H\alpha$ and $H\beta$ in Be Stars, **190**, 505, 33-E7; Suppl. **27**, 121 (No. 240).
- Gray, S. Peter. Solar Cosmic-Ray Acceleration by a Plasma Instability, **187**, 195, 2-G6.
- Green, Louis C., and Kolchin, Eleanor K. The Structure of Synchronously Rotating Close Binaries Built on Polytropic Model $\nu = 3$, **194**, 757, 84-B12; Suppl. **28**, 449 (No. 271).
- Green, S., Montgomery, J. A., Jr., and Thaddeus, P. Tentative Identification of U93.174 as the Molecular Ion N_2H^+ , **193**, L89, 69-E6.
- Green, Sheldon, and Thaddeus, Patrick. Rotational Excitation of HCN by Collisions, **191**, 653, 47-D13.
- Greenberg, J. M. See Mavko et al., Observations of Structure in the Interstellar Polarization Curve: Preliminary Results, **187**, L117, 9-E9.
- Greenberg, J. Mayo. The Interstellar Depletion Mystery, or Where Have All Those Atoms Gone?, **189**, L81, 24-F9.
- Greenstein, Jesse L. A New List of 52 Degenerate Stars. VII., **189**, L131, 27-E4.
- Greenstein, Jesse L. Spectrophotometry of Magnetic Degenerate Stars, **194**, L51, 76-F10.
- Greenstein, Jesse L., and Sargent, Anneila I. The Nature of Faint Blue Stars in the Halo. II., **192**, 813, 61-C11; Suppl. **28**, 157 (No. 259).
- Greenstein, Jesse L., Schmidt, Maarten, and Searle, Leonard. The Spectrum of the Polarized White Dwarf GD 229, **190**, L27, 30-F3.
- Gregory, P. C. See Hughes et al., Daily Observations of Cygnus X-3 at 10.5 GHz during the Period 1973 July-October, **191**, 749, 48-D10.
- Gregory, P. C., and Seaquist, E. R. The Nature of Cygnus X-3 Radio Outbursts from an Analysis of Radiofrequency Spectra, **194**, 715, 83-G1.
- Grenfell, T. C. See Fontaine et al., The Effects of Differences in Composition, Equation of State, and Mixing Length upon the Structure of White-Dwarf Convection Zones, **193**, 205, 65-A9.
- Griffin, R. F., and Gunn, James E. The Palomar Radial-Velocity Spectrometer, **191**, 545, 45-D10.
- Grindlay, J. E., Wright, E. L., and McCrosky, R. E. Search for Optical Emission from Cosmic Gamma-Ray Bursts, **192**, L113, 61-E6.
- Grindlay, Jonathan E., and Fazio, G. G. Cosmic Gamma-Ray Bursts from Relativistic Dust Grains, **187**, L93, 9-D2.
- Groth, Edward J. Optical Pulsations from the HZ Herculis-Hercules X-1 System, **192**, 517, 56-G6.
- Gross, Peter G. See Sweigart and Gross, Horizontal-Branch Evolution with Semiconvection. I. Interior Evolution, **190**, 101, 29-A7.
- Grupsmith, Gerald. See Vanden Bout and Grupsmith, Detection of Interstellar Lithium in the Direction of 55 Cygni, **187**, L9, 3-B8.
- Gutter, H. H. See Harrington et al., The Nearby Double Star G208-44/45, **194**, L87, 80-F12.
- Gull, T. R., and Balick, B. Maps of Spatial and Kinematic Structure of Galactic Nebulae. I. H 76α Studies of M17, M42, W51, and DR 21, **192**, 63, 50-E1.
- Gunn, James E. See Gott and Gunn, The Double Quasar 1548+115a,b as a Gravitational Lens, **190**, L105, 37-F3.
- Gunn, James E. See Gott et al., An Unbound Universe?, **194**, 543, 82-A4.
- Gunn, James E. See Griffin and Gunn, The Palomar Radial-Velocity Spectrometer, **191**, 545, 45-D10.
- Gunn, J. E. See Oke and Gunn, The Distance of BL Lacertae, **189**, L5, 20-G4.

- Gursky, H. See Brinkman et al., Correlation Analysis of X-Ray Emission from Cygnus X-1, **188**, 603, 17-E3.
- Gursky, H. See Giacconi et al., The Third *Uhuru* Catalog of X-Ray Sources, **188**, 667, 18-B12; Suppl. **27**, 37 (No. 237).
- Hack, M. See Boesgaard et al., The Abundance of Boron and Beryllium in Alpha Lyrae, **194**, L143, 84-F1.
- Hackney, K. R. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, **191**, 51, 39-E1.
- Hackney, R. L. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, **191**, 51, 39-E1.
- Hackwell, J. A. See Gehrz and Hackwell, Circumstellar Dust Emission from WC9 Stars, **194**, 619, 82-G4.
- Hackwell, J. A. See Gehrz and Hackwell, New Infrared Measurements of W Virginis Stars, **193**, 385, 67-G7.
- Hackwell, J. A. See Gehrz et al., Infrared Observations of Be Stars from 2.3 to 19.5 Microns, **191**, 675, 47-F8.
- Hackwell, J. A., and Gehrz, R. D. Infrared Photometry of High-Luminosity Supergiants Earlier than M and the Interstellar Extinction Law, **194**, 49, 74-E2.
- Hackwell, J. A., Gehrz, R. D., and Smith, J. R. Infrared Photometry of Wolf-Rayet Stars from 2.3 to 23 Microns, **192**, 383, 55-D11.
- Hackwell, John A., Bopp, Bernard W., and Gehrz, Robert D. Infrared Observations of BD-10°4662, **192**, L79, 57-F11.
- Hacyan, S. See Bisiacchi et al., On the Interpretation of the He II λ4686 Emission Line in HDE 226868 (Cygnus X-1), **190**, L59, 33-F11.
- Hagen, Gretchen L., and van den Bergh, Sidney. Differences between the Evolutionary Tracks of Young Stars in the Galaxy and in the Magellanic Clouds, **189**, L103, 27-C5.
- Hagen, Wendy. See Boesgaard and Hagen, The Age of Alpha Centauri, **189**, 85, 19-G4.
- Hainebach, Kem L., Clayton, Donald D., Arnett, W. David, and Woosley, S. E. On the ϵ -Process: Its Components and their Neutron Excesses, **193**, 157, 64-E3.
- Haisch, Bernhard M. See Cassinelli and Haisch, Polarization by Rotationally Distorted Electron-Scattering Atmospheres, **188**, 101, 11-A13.
- Hammersley, R. E., and Richards, W. G. Λ-Type Doubling in the CD Molecule, **194**, L61, 76-G4.
- Hansen, C. J. See Roughton et al., Stellar Reaction Rates for Proton Capture on ^{28}Si , ^{50}Cr , ^{54}Fe , ^{58}Ni , ^{60}Ni , and ^{61}Ni , **193**, 187, 64-G7.
- Hansen, C. J. See Roughton et al., Thick-Target Measurement of the (p, γ) Stellar Reaction Rates of the Nuclides ^{13}C , ^{28}Si , ^{48}Ti , ^{47}Ti , and ^{56}Fe , **188**, 595, 17-D10.
- Hansen, C. J. See Van Horn and Hansen, A Model for the Transient X-Ray Sources, **191**, 479, 44-G4.
- Hansen, Olav L. Surface Temperature and Emissivity of Mercury, **190**, 715, 37-C3.
- Hansen, Olav L. 12-Micron Emission Features of the Galilean Satellites and Ceres, **188**, L31, 12-E2.
- Haqué, S. S., Lees, R. M., Saint Clair, J. M., Beers, Yardley, and Johnson, Donald R. Microwave Spectrum of ^{13}C Methanol, **187**, L15, 3-B13.
- Hardee, Philip E., and Rose, William K. Relativistic-Particle Beam Instabilities and X-Ray Pulse Production by the Crab Pulsar, **194**, L35, 76-E9.
- Harlan, Eugene. See Spinrad et al., Two Mira Variables in the Stellar System Terzan 5, **192**, 405, 55-F8.
- Harms, R. See Angel et al., Discovery of a Magnetic DA White Dwarf, **194**, L47, 76-F6.
- Harnden, Frank R., Jr. See Gorenstein et al., The X-Ray Spectra of the Vela and Puppis Supernova Remnants and the Shock-Wave Model of Supernova Remnants, **192**, 661, 59-G4.
- Harper, D. A. Far-Infrared Emission from H II Regions. II. Multicolor Photometry of Selected Sources and 2.2 Resolution Maps of M42 and NGC 2024, **192**, 557, 57-C4.
- Harrington, R. S., Dahn, C. C., and Guetter, H. H. The Nearby Double Star G208-44/45, **194**, L87, 80-F12.
- Harris, D. E., and Romanishin, W. Inverse Compton Radiation and the Magnetic Field in Clusters of Galaxies, **188**, 209, 13-A3.
- Harris, William E. The Unusual Horizontal Branch of NGC 2808, **192**, L161, 62-A13.
- Harrison, E. R. Interpretation of Redshifts of Galaxies in Clusters, **191**, L51, 46-A8.
- Harrison, S. W., Henderson, G. A., Massa, L. J., and Solomon, P. Hartree-Fock Bound States for Molecule-Ions HeC^{2+} and HeC^+ , **189**, 605, 27-B2.
- Harrison, Thomas G. See Edwards and Harrison, A Photonutron Mechanism for the Production of Technetium-99 in the Interior of Evolved Stars, **187**, 313, 4-G11.
- Harrison, Thomas G., and Edwards, Terry W. Low-Temperature Photoneutron Sources for Stellar Nucleosynthesis, **187**, 303, 4-G2.
- Hart, H. R., Jr. See Fleischer et al., Composition of Heavy Cosmic Rays from 25 to 180 MeV Per Atomic Mass Unit, **193**, 575, 70-F2.
- Hart, Michael H. An Explanation of the Solar Limb Shift, **187**, 393, 5-F4.
- Hartman, Lee, and Lapedes, Alan S. The Absence of Radio Emission from HZ Herculis, **190**, L67, 33-G5.
- Hartmann, Lee W., and Dolan, Joseph F. Stellar Molecular Abundances. II. The Violet Depression in Carbon Stars, **187**, 151, 2-D11.
- Hartoog, Mark R. See Cowley et al., Element Identifications in Five Ap Stars, **194**, 343, 78-D5.
- Hartoog, Mark R., Cowley, Charles R., and Adelman, Saul J. On the Abundance of Europium, **187**, 551, 8-C1.
- Hartwick, F. D. A., and Hesser, James E. An Additional Constraint on the Early Evolution of the Galaxy from New Observations of 47 Tucanae, **194**, L129, 84-E2.
- Hartwick, F. D. A., and Hesser, James E. Further Observations of Stars in the Intermediate-Age Open Cluster NGC 2477, **192**, 391, 55-E7.
- Hartwick, F. D. A., and McClure, Robert D. Physical Characteristics of Giant Stars in the Draco Dwarf Spheroidal Galaxy, **193**, 321, 67-C3.
- Hartwick, F. D. A., and Sargent, W. L. W. The Mass of M31 as Determined from the Motions of its Globular Clusters, **190**, 283, 31-D3.
- Harvey, G. A. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, **191**, 51, 39-E1.
- Harvey, P. M. See Schwartz et al., Time Variation of the H₂O Maser and Infrared Continuum in Late-Type Stars, **187**, 491, 7-E9.
- Harvey, P. M., Gatley, I., Werner, M. W., Elias, J. H., Evans, N. J., II, Zuckerman, B., Morris, G., Sato, T., and Litvak, M. M. Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission, **189**, L87, 24-F14.
- Harvey, Paul M. Infrared Variability of V1016 Cygni, **188**, 95, 11-A7.
- Harvey, Paul M., Bechis, Kenneth B., Wilson, William J., and Ball, John A. Time Variation in the OH Microwave and Infrared Emission from Late-Type Stars, **191**, 599, 46-A5; Suppl. **27**, 331 (No. 248).
- Hatchett, S. See Kafatos et al., Ionization of Carbon and Nitrogen in the Interclocloud Medium, **187**, L113, 9-E5.
- Hauser, M. G. See Peebles and Hauser, Statistical Analysis of Catalogs of Extragalactic Objects. III. The Shane-Wirtanen and Zwicky Catalogs, **192**, 239, 52-C2; Suppl. **28**, 19 (No. 253).
- Hawkins, F. J. See Becklin et al., Infrared, Radio, and X-Ray Observations of Cygnus X-3, **192**, L119, 61-E11.
- Hawkins, F. J. See Culhane et al., Detection of Soft X-Ray Emission from PSR 0833-45, **190**, L9, 30-D13.
- Hawkins, F. J. See Fabian et al., *Copernicus* X-Ray Observations of NGC 1275 and the Core of the Perseus Cluster, **189**, L59, 24-E1.
- Hawkins, F. J. See Sanford et al., *Copernicus* Observations of Variations in the X-Ray Flux from Cygnus X-1, **190**, L55, 33-F7.
- Hawkins, Frederick. See Davidsen et al., Optical and X-Ray

- Observations of 3U 0614+09, **193**, L25, 66-B9.
- Hawkins, Frederick J. See Mason et al., X-Ray Absorption Events in Cygnus X-1 Observed with *Copernicus*, **192**, L65, 57-E13.
- Hayatsu, Ryoichi. See Anders et al., Interstellar Molecules: Origin by Catalytic Reactions on Grain Surfaces?, **192**, L101, 58-A5.
- Hayes, D. S. See Mavko et al., Observations of Structure in the Interstellar Polarization Curve: Preliminary Results, **187**, L117, 9-E9.
- Hayes, R. W. See Fawcett et al., Theoretical and Experimental Study of Fe xix to Fe xxiv Solar-Flare Spectra and Isoelectronic Spectra in Sulfur, **187**, 377, 5-E3.
- Hazard, C. See Baldwin et al., An Analysis of the Spectrum of the Large-Redshift Quasi-stellar Object OQ 172, **193**, 513, 70-A11.
- Heap, Sara R., and Stecher, Theodore P. Two New Physical Processes in the Far-Ultraviolet Spectrum of Zeta Tauri, **187**, L27, 3-C10.
- Heasley, J. N., Mihalas, Dimitri, and Poland, A. I. Theoretical Helium I Emission-Line Intensities for Quiescent Prominences, **192**, 181, 51-F4.
- Heckman, H. H. See Golden et al., Rigidity Spectrum of $Z \geq 3$ Cosmic-Ray Nuclei in the Range 4 to 285 GV and a Search for Cosmic Antimatter, **192**, 747, 60-F3.
- Hegyi, D. J. See Traub et al., Search for Deuterium in Orion and Detection of High-Velocity Features, **190**, L81, 34-A4.
- Hegyi, D. J., Traub, W. A., and Carleton, N. P. Cosmic Background Radiation at 1.32 Millimeters, **190**, 543, 35-D8.
- Heiles, C. E. See Turner and Heiles, On the Relationship of OH and Formaldehyde with Interstellar Extinction, **194**, 525, 80-C11.
- Heiles, Carl. Low-Density Ionized Interstellar Gas as Revealed by Interstellar Optical and H I Radio Lines, **193**, L31, 66-C3.
- Heiles, Carl. See Margon et al., A Search for a Cosmological Component of the Soft X-Ray Background in the Direction of M31, **191**, L117, 49-B3.
- Heiles, Carl. See Troland and Heiles, Observations of H₂CO in the Direction of Cassiopeia A, **194**, 43, 74-D10.
- Heiles, Carl. See Turner et al., Fine Structure in H II Regions. II, **194**, 279, 77-F1.
- Heintz, Wulff D. See Worth and Heintz, Parallax, Orbit, and Mass of the Binary Star 70 Ophiuchi, **193**, 647, 71-D1.
- Heinz, C. J., Clark, G. W., Lewin, W. H. G., Schnopper, H. W., and Sprott, G. F. OSO-7 Observations of a High-Latitude X-Ray Source Associated with Abell Cluster A2052, **188**, L41, 15-D11.
- Helava, H. See Weisskopf et al., An Upper Limit to an X-Ray Point Source at the Center of the Cygnus Loop, **194**, L71, 80-E10.
- Helava, H. See Wolff et al., X-Ray Morphology of the Perseus Cluster, **193**, L53, 69-B11.
- Hemsworth, R. S. See Schiff et al., Laboratory Measurements of Some Ion-Molecule Reactions Related to the Formation of HCN in Dense Interstellar Clouds, **191**, L49, 42-D7.
- Henderson, G. A. See Harrison et al., Hartree-Fock Bound States for Molecule-Ions HeC⁺ and HeC²⁺, **189**, 605, 27-B2.
- Henize, K. G. See Spear et al., Ultraviolet Spectrophotometry of Sirius from *Gemini* 12, **192**, 615, 59-D2.
- Henize, Karl G. See Carlson and Henize, The Peculiar Star He 2-177: A Slow Nova and a Possible X-Ray Source, **188**, L47, 15-E2.
- Henry, R. C. See Gerola et al., Evidence for a Corona of Beta Geminorum, **193**, L107, 72-F1.
- Henry, R. C. See Moos et al., High-Spectral-Resolution Measurements of the H I $\lambda 1216$ and Mg II $\lambda 2800$ Emissions from Arcturus, **188**, L93, 18-D5.
- Herbig, G. H. Structure of the OH/Infrared Object NML Cygnus. II. Analysis of the OH Interferometry, **189**, 75, 19-F9.
- Herbig, G. H. VY Canis Majoris. IV. The Emission Bands of ScO, **188**, 533, 16-G4.
- Herbig, G. H. See Wehinger et al., Identification of H₂O⁺ in the Tail of Comet Kohoutek (1973f), **190**, L43, 30-G6.
- Herbig, G. H., and Lorre, Jean. Structure of the OH/Infrared Object NML Cygnus. I. Analysis of the Near-Infrared Image, **189**, 73, 19-F7.
- Herbst, E., Patterson, T. A., Norcross, D. W., and Lineberger, W. C. Is H⁺ a Source of Diffuse Interstellar Lines?, **191**, L143, 49-C11.
- Herbst, Eric, and Klemperer, William. Is X-ogen HCO⁺?, **188**, 255, 13-D6.
- Herbst, William, Hesser, James E., and Ostriker, Jeremiah P. The 71-Second Variation of DQ Herculis, **193**, 679, 71-F9.
- Herzberg, G. See Wehinger et al., Identification of H₂O⁺ in the Tail of Comet Kohoutek (1973f), **190**, L43, 30-G6.
- Hesser, James E. See Hartwick and Hesser, An Additional Constraint on the Early Evolution of the Galaxy from New Observations of 47 Tucanae, **194**, L129, 84-E2.
- Hesser, James E. See Hartwick and Hesser, Further Observations of Stars in the Intermediate-Age Open Cluster NGC 2477, **192**, 391, 55-E7.
- Hesser, James E. See Herbst et al., The 71-Second Variation of DQ Herculis, **193**, 679, 71-F9.
- Hesser, James E., Lasker, Barry M., and Osmer, Patrick S. High-Frequency Stellar Oscillations. X. The Rapid Blue Variable CD-42°14462, **189**, 315, 23-D14.
- Hewitt, Thomas G., and Noerdlinger, Peter D. Transfer of Resonance-Line Radiation in Differentially Expanding Atmospheres. III. Formation of P Cygni-Type Lines by a Doublet Line or Two Partially "Blended" Lines, **188**, 315, 14-A8.
- Hildner, E. See MacQueen et al., The Outer Solar Corona as Observed from *Skylab*: Preliminary Results, **187**, L85, 6-D7.
- Hill, R., Burginyon, G., Grader, R., Toor, A., Stoering, J., and Seward, F. An Unusual X-Ray Source in Scutum, **189**, L69, 24-E10.
- Hill, R. W., Burginyon, G. A., Seward, F. D., Stoering, J. P., and Toor, A. A Search for Soft X-Ray Sources in the Galactic Anticenter. Absorption of X-Rays from the Crab Nebula, **187**, 505, 7-F9.
- Hills, J. G. Are the UV Stars Nuclear-powered?, **190**, 109, 29-A14.
- Hiltner, W. A. See Mavko et al., Observations of Structure in the Interstellar Polarization Curve: Preliminary Results, **187**, L117, 9-E9.
- Hiltner, W. A. See Mook et al., Color Variations of Scorpius X-1, **191**, 493, 34-A2.
- Hiltner, W. A. See Osmer and Hiltner, Optical Spectra and the Mass of SMC X-1, **188**, L5, 12-C5.
- Hiltner, W. A. See Petro and Hiltner, Optical Observations of HD 77581 and a Model for the System HD 77581-2U 0900-40, **190**, 661, 36-F7.
- Hinata, Satoshi, and Jackson, E. Atlee. On the Axisymmetric Pulsar Atmosphere, **192**, 703, 60-C1.
- Hinteregger, H. F. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, **193**, 293, 67-A4.
- Hintzen, P. See Angel et al., G240-72: A New Magnetic White Dwarf with Unusual Polarization, **190**, L71, 33-G9.
- Hintzen, Paul, Scott, John, and Whelan, John. Are All Blue Stragglers Close Binaries?, **194**, 657, 83-C2.
- Hintzen, Paul, and Strittmatter, P. A. A Spectroscopic Search for Cool White Dwarfs, **193**, L111, 72-F5.
- Hintzen, Paul M. N. O. See Grandi et al., The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis, **190**, 365, 32-C1.
- Hirose, Chiaki. Laboratory Microwave Spectrum of Ethylene Oxide, **189**, L145, 27-F1.
- Hirshfield, Alan. See Spitzer et al., Column Densities of Interstellar Molecular Hydrogen, **193**, 759, 72-E4; Suppl. **28**, 373 (No. 266).
- Hjellming, R. M., Brown, R. L., and Blankenship, L. C. Some Problems with the Radio Source Cygnus X-3, **194**, L13, 76-D1.
- Hobbs, L. M. A Comparison of Interstellar Na I, Ca II, and K I Absorption, **191**, 381, 43-G6.

- Hobbs, L. M. Interferometric Scans of Interstellar K I Lines, **188**, L67, 15-F5.
- Hobbs, L. M. On Ionization in H I Regions, **188**, L107, 18-E3.
- Hobbs, L. M. Statistical Properties of Interstellar Clouds, **191**, 395, 44-A7.
- Hocking, W. H., Gerry, M. C. L., and Winnewisser, G. The Dipole Moment of Isocyanic Acid, HNCO, and Its Astrophysical Consequences, **187**, L89, 6-D13.
- Hodge, P. W., and Smith, Dale W. The Structure of the Fornax Dwarf Galaxy, **188**, 19, 10-B6.
- Hodge, Paul W. Filaments from the Galaxy NGC 1569, **191**, L21, 42-B7.
- Hodge, Paul W. A Second Survey of H II Regions in Galaxies, **190**, 241, 30-C14; Suppl. **27**, 113 (No. 239).
- Hodge, Paul W. The Transparency of the Small Magellanic Cloud, **192**, 21, 50-B5.
- Höglund, B. See Johansson et al., OH Observations near the Reflection Nebulae NGC 2068 and NGC 2071, **189**, 455, 25-E6.
- Hollars, D. R. Calcium II K Emission in RT Aurigae, **194**, 137, 75-D3.
- Holm, A. V. See Doherty et al., Ultraviolet Photometry from the Orbiting Astronomical Observatory. XI. The 1971 Eclipse of 32 Cygni, **187**, 521, 8-A1.
- Holm, A. V. See Gallagher and Holm, Ultraviolet Detection of the Nova Variables V603 Aquilae and RR Pictoris, **189**, L123, 27-D10.
- Holm, Albert V., and Gallagher, John S., III. Ultraviolet Detection of the Dwarf Nova SS Cygni, **192**, 425, 56-A1.
- Holt, S. S. See Rothschild et al., Millisecond Temporal Structure in Cygnus X-1, **189**, L13, 20-G11.
- Holt, S. S., Boldt, E. A., Rothschild, R. E., Saba, J. L. R., and Serlemitsos, P. J. A New Measurement of the Hercules X-1 X-Ray Pulse Profile, **190**, L109, 37-F7.
- Holt, S. S., Boldt, E. A., Serlemitsos, P. J., Murray, S. S., Giacconi, R., Kellogg, E. M., and Matilsky, T. A. On the Nature of the Unidentified High-Latitude *Uhuru* Sources, **188**, L97, 18-D8.
- Honeycutt, R. Kent. See Kalinowski et al., On a Possible Carbon-Star Member of the Old Open Cluster Trumpler 5, **193**, L77, 69-D8.
- Horwitz, G. See Katz and Horwitz, Thermodynamic Stability of Relativistic Rotating Stellar Configurations and a Maximum Principle for the Entropy, **194**, 439, 79-D3.
- Houck, J. R., Schaak, D. F., and Reed, R. A. 20 to 40 Micron Spectroscopy of the Orion Nebula, **193**, L139, 73-A7.
- Howard, A. J., Jensen, H. B., Rios, M., Fowler, William A., and Zimmerman, Barbara A. Measurement and Theoretical Analysis of Some Reaction Rates of Interest in Silicon Burning, **188**, 131, 11-C13.
- Hoyle, Fred. See Clayton and Hoyle, Gamma-Ray Lines from Novae, **187**, L101, 9-D9.
- Hoyle, Fred., and Clayton, Donald D. Nucleosynthesis in White-Dwarf Atmospheres, **191**, 705, 48-A8.
- Huang, Su-Shu. Interpretation of Epsilon Aurigae. II. Infrared Excess, Secondary Light Variations, and Plausible Formation of a Planetary System, **187**, 87, 1-G6.
- Huang, Su-Shu. Interpretation of Epsilon Aurigae. III. Study of the Light Curve Based on Disk Models, **189**, 485, 25-G10.
- Huang, Su-Shu. See Albert and Huang, Profiles of Emission Lines in Be Stars. III. Further Study of the Long-Period V/R Variation, **189**, 479, 25-G5.
- Hubbard, W. B. Deuterium Enrichment of Metallic Hydrogen, **190**, 223, 30-B11.
- Hubbard, W. B. See Anderson et al., Structure of the Jovian Envelope from *Pioneer 10* Gravity Data, **193**, L149, 73-B3.
- Huber, M. C. E. See Foukal et al., Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount, **193**, L143, 73-A10.
- Huber, M. C. E. See Reeves et al., Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount, **188**, L27, 12-D11.
- Huber, Martin C. E. Hook-Method Measurements of *gf*-Values for Ultraviolet Fe I and Fe II Lines on a Shock Tube, **190**, 237, 30-C10.
- Huber, Martin C. E., Foukal, P. V., Noyes, R. W., Reeves, E. M., Schmahl, E. J., Timothy, J. G., Vernazza, J. E., and Withbroe, G. L. Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from *Skylab*, **194**, L115, 81-B2.
- Hudson, H. S. See Soifer and Hudson, Submillimeter Observations of the Orion Nebula and NGC 2024, **191**, L83, 46-C11.
- Hudson, H. S., and Lindsey, C. A. Direct Observation of Temperature Amplitude of Solar 300-Second Oscillations, **187**, L35, 3-D4.
- Huffman, D. R. See Day et al., A Quantitative Study of Silicate Extinction, **191**, 415, 44-B13.
- Hughes, V. A., Woodsworth, A., Gregory, P. C., and Seaquist, E. R. Daily Observations of Cygnus X-3 at 10.5 GHz during the Period 1973 Systems, **190**, 339, 32-A1.
- Huguenin, G. R., and Moore, E. L. A Search for Isolated Radiofrequency Pulses, **187**, L57, 6-B9.
- Hulse, R. A., and Taylor, J. H. A High-Sensitivity Pulsar Survey, **191**, L59, 46-B3.
- Hummer, D. G. See Crandall et al., Rate Coefficients for Electron Excitation of the First Resonance Transition in H, Li, Na, Ca, Ca⁺, and Ba⁺ Calculated from Experimental Data, **191**, 789, 48-G5.
- Hummer, D. G. See Mihalas and Hummer, Theory of Extended Stellar Atmospheres. I. Computational Method and First Results for Static Spherical Models, **193**, 503, 69-B1; Suppl. **28**, 343 (No. 265).
- Hummer, David G. See Mihalas and Hummer, Some Observational Implications of Extended Static O-Star Model Atmospheres, **189**, L39, 21-B9.
- Humphreys, R. M., and Ney, E. P. Visual and Infrared Observations of Late-Type Supergiants in the Southern Sky, **194**, 623, 82-G8.
- Humphreys, Roberta M. M Supergiants in the Large Magellanic Cloud, **190**, L133, 37-G12.
- Humphreys, Roberta M. Veiling and the Presence of Circumstellar Gas and Dust in Some Infrared Stars, **188**, 75, 10-F9.
- Humphreys, Roberta M., and Kerr, Frank J. A Velocity Separation of Stars and Gas in Carina, **194**, 301, 78-A2.
- Humphreys, Roberta M., and Ney, E. P. Infrared Stars in Binary Systems, **190**, 339, 32-A1.
- Humphreys, Roberta M., and Ney, E. P. Supergiant Binary Stars, **187**, L75, 6-C12.
- Humphries, C. M. See Thompson et al., A Broad Absorption Region in the Ultraviolet Spectra of Early-Type Stars, **187**, L81, 6-D3.
- Hunter, James H., Jr., and Nightingale, Stephen L. The Influence of Dust upon the Dynamics and Stability of Planetary Nebulae. II., **193**, 693, 71-G9.
- Hurford, G. J., Mewaldt, R. A., Stone, E. C., and Vogt, R. E. The Energy Spectrum of 0.16 to 2 MeV Electrons during Solar Quiet Times, **192**, 541, 57-B2.
- Hurley, K. See Bui-Van et al., High-Energy X-Rays from the Perseus Cluster, **188**, 217, 13-A11.
- Hurley, K. See Bui-Van and Hurley, Multiple Inverse Compton Scattering and the Diffuse X-Ray Component, **188**, L51, 15-E6.
- Hutchings, J. B. Analysis of the Blue Spectrum of the X-Ray Binary HD 153919, **192**, 677, 60-A6.
- Hutchings, J. B. On the Light Curves and Masses of the X-Ray Sources Cygnus X-1, SMC X-1, and Centaurus X-3, **193**, L61, 69-C7.
- Hutchings, J. B. The Synthesis of Close-Binary Light Curves. VI. X-Ray and Collapsar Binaries, **188**, 341, 14-C4.
- Hutchings, J. B. The X-Ray Binary HD 77581, **192**, 685, 60-A13.
- Hutchings, J. B. See Crampton and Hutchings, A Spectroscopic Analysis of HZ Herculis, **191**, 483, 44-G7.
- Hutchings, J. B., Cowley, A. P., Crampton, D., Fahlmann, G., Glaspey, J. W., and Walker, G. A. H. H α Emission in Cygnus X-1, **191**, 743, 48-D4.
- Hutchings, J. B., Cowley, A. P., Crampton, D., and Redman, R. O. Evidence for the Existence of a Massive Companion to X

- Persei (=2U 0352+30?), **191**, L101, 49-A2.
- Hutton, L. K. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, **193**, 293, 67-A4.
- Hwang, A. E., and Dykla, John J. Can a Neutron Star Be Compressed into a Black Hole?, **192**, L141, 61-G8.
- Hyland, A. R., and Mould, J. R. Lines of Neutral Barium and the Abundance of Barium in Two K Supergiants, **187**, 277, 4-E5.
- Iben, Icko, Jr. See Böhm-Vitense et al., Masses and Luminosities of Population II Cepheids, **194**, 125, 75-C6.
- Iguchi, T. See Kaiju et al., Detection of Interstellar Methylamine, **191**, L135, 49-C5.
- Illingworth, Garth, and Freeman, K. C. The Mass of the Globular Cluster NGC 6388, **188**, L83, 18-C10.
- Imhof, W. L., Nakano, G. H., Johnson, R. G., Kilner, J. R., Reagan, J. B., Klebesadel, R. W., and Strong, I. B. Spectra Measurements of a Cosmic Gamma-Ray Burst with Fast Time Resolution, **191**, L7, 42-A7.
- Innanen, K. A. See Keenan and Innanen, The Galactic Orbit of the Old Open Cluster NGC 2420, **189**, 205, 22-C11.
- Intriligator, D. S. Evidence of Solar-Cycle Variations in the Solar Wind, **188**, L23, 12-D8.
- Ipser, James R. On Using Entropy Arguments to Study the Evolution and Secular Stability of Spherical Stellar-Dynamical Systems, **193**, 463, 68-F5.
- Irvine, Cynthia E. See Irvine and Irvine, A New Optical Supernova Remnant in Centaurus, **192**, L111, 61-E2.
- Irvine, Nelson J. The Recent Shell Event of Zeta Ophiuchi, **188**, L19, 12-D4.
- Irvine, Nelson J., and Irvine, Cynthia E. A New Optical Supernova Remnant in Centaurus, **192**, L111, 61-E2.
- Jackson, E. Atlee. See Hinata and Jackson, On the Axisymmetric Pulsar Atmosphere, **192**, 703, 60-C1.
- Jackson, P. D., and Kellman, Sanford A. A Redetermination of the Galactic H I Half-Thickness and a Discussion of Some Dynamical Consequences, **190**, 53, 28-D13.
- Jacobs, V. L., Bhatia, A. K., and Temkin, A. Radiative Transitions Involving the $(2p^1)3P^0$ Metastable Autodetaching State of H $^+$, **191**, 785, 48-G1.
- Jacobsen, Theodor S. New High-Dispersion Radial-Velocity Curves of W Sagittarii, **191**, 691, 47-G8.
- Jameson, R. F., Longmore, A. J., McLinn, J. A., and Woolf, N. J. Infrared Emission by Dust in NGC 1068 and Three Planetary Nebulae, **190**, 353, 32-B2.
- Jameson, R. F., Longmore, A. J., McLinn, J. A., and Woolf, N. J. Infrared Spectrum of NGC 1068, **187**, L109, 9-E2.
- Janes, K. A. Intermediate-Band Photometry of M67, **189**, 423, 25-C1.
- Jauncey, D. L. See Condon et al., Interpretation of Saturn's Decimetric Radio Emission, **193**, 257, 65-E1.
- Jauncey, D. L. See Kellermann et al., Further Observations of Apparent Changes in the Structure of 3C 273 and 3C 279, **189**, L19, 21-A3.
- Jefferts, S. See Sanyal et al., Short-Term Spectral Variability of γ_2 Velorum, Photometric Observations, **187**, L31, 3-D1.
- Jefferts, K. B. See Phillips et al., Large-Scale Wave Structure in the Orion Molecular Cloud, **191**, L31, 42-C5.
- Jefferts, K. B. See Phillips et al., A New DCN Line: DCN(HCN) Excitation, **192**, L153, 62-A5.
- Jefferts, K. B. See Liszt et al., CO and CS in the Orion Nebula, **190**, 557, 35-E8.
- Jefferts, K. B. See Scoville et al., Molecular Clouds in the Galactic Nucleus, **187**, L63, 6-C1.
- Jenkins, Edward B., and Meloy, Debra Anne. A Survey with *Copernicus* of Interstellar O VI Absorption, **193**, L121, 72-G1.
- Jenkins, Edward B., Morton, Donald C., and York, Donald G. Rocket-Ultraviolet Spectra of Kappa, Lambda, Tau, and Upsilon Scorpii, **194**, 77, 74-G1.
- Jenkins, Edward B., and Savage, Blair D. Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIV. An Extension of the Survey of Lyman- α Absorption from Interstellar Hydrogen, **187**, 243, 4-C1.
- Jenner, David C. Supergiant Galaxies with Multiple Nuclei, **191**, 55, 39-E5.
- Jensen, Eric B. See Grandi et al., The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis, **190**, 365, 32-C1.
- Jensen, H. B. See Howard et al., Measurement and Theoretical Analysis of Some Reaction Rates of Interest in Silicon Burning, **188**, 131, 11-C13.
- Jewsbury, C. P. See Schmidt et al., A Comparison of Variable and Nonvariable Stars in the Cepheid Strip, **189**, 293, 23-C5.
- Johansson, L. E. B., Höglund, B., Winnberg, A., Nguyen-Q-Rieu, and Goss, W. M. OH Observations near the Reflection Nebulae NGC 2068 and NGC 2071, **189**, 455, 25-E6.
- Johnson, D. R. See Clark and Johnson, Magnetic Fields in the Orion Molecular Cloud from the Zeeman Effect in SO, **191**, L87, 46-D1.
- Johnson, D. R. See Snyder et al., Radio Detection of Interstellar Dimethyl Ether, **191**, L79, 46-C7.
- Johnson, Donald R. See Buhl et al., Silicon Monoxide: Detection of Maser Emission from the Second vibrationally Excited State, **192**, L97, 58-A1.
- Johnson, Donald R. See Haque et al., Microwave Spectrum of ^{13}C Methanol, **187**, L15, 3-B13.
- Johnson, H. M. See Catura et al., The Extended X-Ray Source in Virgo and its Relation to M87, **190**, 521, 35-B1.
- Johnson, H. R., Milkey, R. W., and Ramsey, L. W. Formation of the Luminosity-sensitive O I Multiplet at 7774 Å, **187**, 147, 2-D7.
- Johnson, Harold L. See Sandage and Johnson, A Preliminary Photoelectric Sequence in the Galaxy M33 of the Local Group, **191**, 63, 39-E13.
- Johnson, Harold L. See Thompson and Johnson, A Lower Limit on the $^{12}\text{C}/^{13}\text{C}$ Ratio in Alpha Herculis, **193**, 147, 64-D8.
- Johnson, Hugh M. The Gamma Cygni Supernova Remnant and Nebula, **194**, 337, 78-C11.
- Johnson, R. G. See Imhof et al., Spectra Measurements of a Cosmic Gamma-Ray Burst with Fast Time Resolution, **191**, L7, 42-A7.
- Johnson, Torrence V. See Matson et al., Sodium D-Line Emission from Io: Sputtering and Resonant Scattering Hypothesis, **192**, L43, 53-D1.
- Johnson, W. A. See Wilson et al., Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters, **191**, 357, 43-E11.
- Jokipii, J. R. Pitch-Angle Scattering of Charged Particles in a Random Magnetic Field, **194**, 465, 79-E14.
- Jokipii, J. R. See Forman et al., Cosmic-Ray Streaming Perpendicular to the Mean Magnetic Field, **192**, 535, 57-A10.
- Jones, C. See Forman et al., *Uhuru* Observations of Short-Time-Scale Variations of the Crab, **193**, L67, 69-C12.
- Jones, C., Giacconi, R., Forman, W., and Tananbaum, H. Observations of Circinus X-1 from *Uhuru*, **191**, L71, 46-B13.
- Jones, C. A., Chetin, Timur, and Liller, W. Optical Studies of *Uhuru* Sources. VIII. Observations of 92 Possible Counterparts of X-Ray Sources, **190**, L1, 30-D4.
- Jones, Eric M. Pulsar-Supernova-Remnant Pairs and the Galactic Gravitational Field, **191**, 207, 41-A8.
- Jones, Terry J., Wolff, Sidney C., and Bonsack, Walter K. The Holmium Ap Star HD 51418, **190**, 579, 35-G2.
- Jones, T. W. The Significance of Radio Flux Variations in PKS 0735+178, **191**, L15, 42-B1.
- Jones, T. W. See Burbidge et al., Physics of Compact Nonthermal Sources. III. Energetic Considerations, **193**, 54, 63-D4.
- Jones, T. W. See Gehrz et al., Infrared Observations of Be Stars from 2.3 to 19.5 Microns, **191**, 675, 47-F8.
- Jones, T. W., O'Dell, S. L., and Stein, W. A. Physics of Compact Nonthermal Sources. I. Theory of Radiation Processes, **188**, 353, 14-D2.
- Jones, T. W., O'Dell, S. L., and Stein, W. A. Physics of Compact Nonthermal Sources. II. Determination of Physical Parameters, **192**, 261, 54-B8.
- Joseph, R. D. See Friedlander et al., Detection of New Celestial Objects at Far-Infrared Wavelengths, **194**, L5, 76-C6.

- Joss, P. C. See Avni et al., Upper Limit on 2.5-Second Pulsations from Hercules X-1, **188**, L35, 15-D6.
- Joss, P. C. See Bahcall et al., Optical Properties of HZ Herculis, **191**, 211, 41-A11.
- Joss, Paul C. Are Stellar Surface Heavy-Element Abundances Systematically Enhanced?, **191**, 771, 48-F1.
- Joy, Alfred H., and Abt, Helmut A. Spectral Types of M Dwarf Stars, **192**, 237, 52-C1; Suppl. **28**, 1 (No. 252).
- Joyce, R. R. See Gezari et al., 350-Micron Mapping of the Orion Molecular Cloud, **191**, L33, 42-C7.
- Juliússon, Einar. Charge Composition and Energy Spectra of Cosmic-Ray Nuclei at Energies above 20 GeV per Nucleon, **191**, 331, 43-C14.
- Jura, M. Chlorine-bearing Molecules in Interstellar Clouds, **190**, L33, 30-F12.
- Jura, M. Formation and Destruction Rates of Interstellar H₂, **191**, 375, 43-G1.
- Jura, M., and Wright, E. L. Helium Abundance at the Galactic Center, **188**, 473, 16-C2; Erratum, **193**, 291, 65-G7.
- Kafatos, M., Gerola, H., Hatchett, S., and McCray, R. Ionization of Carbon and Nitrogen in the Intercloud Medium, **187**, L113, 9-E5.
- Kafatos, Minas. See Gerola et al., Statistical Time-dependent Model for the Interstellar Gas, **189**, 55, 19-E1.
- Kaifu, N., Morimoto, M., Nagane, K., Akabane, K., Iguchi, T., and Takagi, K. Detection of Interstellar Methylamine, **191**, L135, 49-C5.
- Kaler, J. B. See Lee et al., Spectrophotometric Studies of Gaseous Nebulae. XXIII. The Planetary Nebula NGC 6803, **192**, 159, 51-D10.
- Kaler, James B. High Helium Abundances in Two Planetary Nebulae, **188**, L15, 12-D1.
- Kalinowski, J., Keith, Burkhead, Martin S., and Honeycutt, R. Kent. On a Possible Carbon-Star Member of the Old Open Cluster Trumpler 5, **193**, L77, 69-D8.
- Kalkofen, Wolfgang. Complete Linearization of the Integral Equations in Radiative Transfer, **188**, 105, 11-B3.
- Kamper, W. A. See Beardsley et al., A Study of an Early Flare, Residual Velocities, and Parallax Residuals for Possible Orbital Motion of HD 103095 (Groombridge 1830), **194**, 637, 83-A8.
- Kapitzky, J. E., and Dent, W. A. A High-Resolution Map of the Galactic-Center Region, **188**, 27, 10-B13.
- Kastner, Sidney O., Neupert, W. M., and Swartz, M. Solar-Flare Emission Lines in the Range from 66 to 171 Å; $2\pi r_2 p_k^k - 2\pi r_1 p_k^{k+1}$ Transitions in Highly Ionized Iron, **191**, 261, 41-E3.
- Kastner, Sidney O., and Wade, Clarence. Dipole and Quadrupole Integrals for the C I, N I, and O I Sequences, **190**, 745, 37-E2; Suppl. **27**, 247 (No. 243).
- Katem, Basil. See Kristian et al., On the Systematic Optical Identification of the Remaining 3C Radio Sources. I. A Search in 47 Fields, **191**, 43, 39-C12.
- Katz, J., and Horwitz, G. Thermodynamic Stability of Relativistic Rotating Stellar Configurations and a Maximum Principle for the Entropy, **194**, 439, 79-D3.
- Katz, J. I. See Bahcall et al., Multiple Star Systems and X-Ray Sources, **189**, L17, 21-A1.
- Katz, J. I., Malone, R. C., and Salpeter, E. E. Models for Nuclei of Planetary Nebulae and Ultraviolet Stars, **190**, 359, 32-B8.
- Katz, J. I., and Salpeter, E. E. X-Ray Emission from Vibrating White Dwarfs, **193**, 429, 68-C12.
- Keeley, Douglas A. The Saturation Behavior of Nonuniformly Pumped Masers, **192**, 601, 59-C2.
- Keenan, D. W., and Innanen, K. A. The Galactic Orbit of the Old Open Cluster NGC 2420, **189**, 205, 22-C11.
- Keenan, Philip C., Garrison, Robert F., and Deutsch, Armin J. Revised Catalog of Spectra of Mira Variables of Type Me and Se, **193**, 289, 65-G5; Suppl. **28**, 271 (No. 262).
- Kellermann, K. I. Detection of a Strong and Possibly Variable Compact Millimeter Wave Component in Centaurus A, **194**, L135, 84-E8.
- Kellermann, K. I., Clark, B. G., Shaffer, D. B., Cohen, M. H., Jauncey, D. L., Broderick, J. J., and Niell, A. E. Further Observations of Apparent Changes in the Structure of 3C 273 and 3C 279, **189**, L19, 21-A3.
- Kellman, Sanford A. See Jackson and Kellman, A Redetermination of the Galactic H I Half-Thickness and a Discussion of Some Dynamical Consequences, **190**, 53, 28-D13.
- Kellogg, E. See Giacconi et al., The Third *Uhuru* Catalog of X-Ray Sources, **188**, 667, 18-B12; Suppl. **27**, 37 (No. 237).
- Kellogg, E., and Murray, S. Studies of Cluster X-Ray Sources: Size Measurements, **193**, L57, 69-C3.
- Kellogg, E. M. See Brinkman et al., Correlation Analysis of X-Ray Emission from Cygnus X-1, **188**, 603, 17-E3.
- Kellogg, E. M. See Holt et al., On the Nature of the Unidentified High-Latitude *Uhuru* Sources, **188**, L97, 18-D8.
- Kellogg, P. J. See Windsor and Kellogg, Polarization of Inverse Plasmon Scattering, **190**, 167, 29-E14.
- Kemic, S. B. Hydrogen and Helium Features in Magnetic White Dwarfs, **193**, 213, 65-B2.
- Kemp, James C. See Swedlund et al., Discovery of Time-Varying Circular and Linear Polarization in the White Dwarf Suspect GD 229, **187**, L121, 9-E12.
- Kemp, James C. See Swedlund et al., DQ Herculis: Periodic Circular Polarization Synchronous with the Rapid Light Variations, **193**, L11, 66-A12.
- Kemp, James C., Coyne, George V., S.J., Swedlund, John B., and Wolstencroft, Ramon D. On the Linear Polarization of GD-229, **189**, L79, 24-F7.
- Kemp, James C., Swedlund, John B., and Wolstencroft, Ramon D. DQ Herculis: Periodic Linear Polarization Synchronous with the Rapid Light Variations, **193**, L15, 66-B1.
- Kennel, C. F. See Coroniti et al., Stably Trapped Proton Fluxes in the Jovian Magnetosphere, **189**, 383, 24-B13.
- Kerr, Frank J. See Humphreys and Kerr, A Velocity Separation of Stars and Gas in Carina, **194**, 301, 78-A2.
- Khachikian, E. Ye., and Weedman, D. W. A Blue Galactic Nucleus with a Featureless Spectrum, **189**, L99, 27-C1.
- Khachikian, Edward Ye., and Weedman, Daniel W. An Atlas of Seyfert Galaxies, **192**, 581, 59-A7.
- Kieffer, H. See Gatley et al., Infrared Observations of Phobos from *Mariner 9*, **190**, 497, 33-E2.
- Kifune, T. See Wolff et al., X-Ray Morphology of the Perseus Cluster, **193**, L53, 69-B11.
- Kilner, J. R. See Imhof et al., Spectra Measurements of a Cosmic Gamma-Ray Burst with Fast Time Resolution, **191**, L7, 42-A7.
- Kinman, T. D. See Carswell et al., Optical Observations of the Radio Source 0735+178, **190**, L101, 37-E11.
- Kinman, T. D. See Rieke and Kinman, Correlated and Infrared Behavior of OJ 287 and Similar Radio Sources, **192**, L115, 61-E8.
- Kinman, T. D. See Strom et al., Optical Polarization of Selected Herbig-Haro Objects, **191**, L93, 46-D6.
- Kinman, T. D., Grasdalen, G. L., and Rieke, G. H. Optical and Infrared Observations of the Jet of M87, **194**, L1, 76-C2.
- Kinzer, R. L. See Share et al., Diffuse Cosmic Gamma Radiation above 10 MeV, **187**, 511, 7-G2.
- Kinzer, R. L. See Share et al., Observation of Gamma-Radiation from the Galactic Center Region, **187**, 45, 1-D1.
- Kiplinger, Alan L. On the Short-Timescale Variability of OJ 287, **191**, L109, 49-A9.
- Kirshner, R. P. See Woodgate et al., Detection of the [Fe xiv] Coronal Line at 5303 Å in the Cygnus Loop, **188**, L79, 18-C6.
- Kirshner, Robert P. Spectrophotometry of the Crab Nebula, **194**, 323, 78-B12.
- Kirshner, Robert P., and Kwan, John. Distances to Extragalactic Supernovae, **193**, 27, 63-C1.
- Klebesadel, R. W. See Imhof et al., Spectra Measurements of a Cosmic Gamma-Ray Burst with Fast Time Resolution, **191**, L7, 42-A7.
- Klebesadel, Ray W. See Strong et al., A Preliminary Catalog of Transient Cosmic Gamma-Ray Sources Observed by the *Vela* Satellites, **188**, L1, 12-C2.
- Kleinmann, D. E. See Becklin et al., Infrared Emission from the

- Southern H II Region H2-3. **187**, 487, 7-E6.
- Kleinmann, D. E. See Fazio et al., A High-Resolution Map of the Orion Nebula Region at Far-Infrared Wavelengths. **192**, L23, 53-B8.
- Kleinmann, D. E., and Wright, E. L. 10-Micron Observations of Southern-Hemisphere Galaxies. **191**, L19, 42-B5.
- Klemperer, W. K. See Mutel et al., VLBI Observations of the Crab Nebula and the Wavelength Dependence of Interstellar Scattering. **193**, 279, 65-F9.
- Klemperer, W. K. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers. **193**, 293, 67-A4.
- Klemperer, William. See Herbst and Klemperer, Is X-ogen HCO⁺? **188**, 255, 13-D6.
- Klimas, A. J. See Fisk et al., The Fokker-Planck Coefficient for Pitch-Angle Scattering of Cosmic Rays. **190**, 417, 32-F7.
- Knacke, R. F., and Capps, R. W. Infrared Polarization of NGC 1068. **192**, L19, 53-B4.
- Knapp, G. R. See Brown and Knapp, Detection of Radio Recombination-Line Emission from the Rho Ophiuchi Dark Cloud. **189**, 253, 22-G3.
- Knapp, G. R. See Brown et al., The Nature and Distribution of Carbon Recombination-Line Emission in the Rho Ophiuchi Dark Cloud. **192**, 607, 59-C8.
- Knapp, S. L. See Currie et al., Four Stellar-Diameter Measurements by a New Technique: Amplitude Interferometry. **187**, 131, 2-C5.
- Kniffen, D. A. See Thompson et al., SAS-2 Observations of the High-Energy Gamma Radiation from the Vela Region. **190**, L51, 33-F4.
- Knox, Keith T., and Thompson, Brian J. Recovery of Images from Atmospherically Degraded Short-Exposure Photographs. **193**, L45, 66-D1.
- Koch, D. See Giacconi et al., The Third *Uhuru* Catalog of X-Ray Sources. **188**, 667, 18-B12; Suppl. **27**, 37 (No. 237).
- Kojoian, G. See Sistla et al., Radio-Continuum Measurements of Planetary Nebulae at 15.5 GHz. **192**, 165, 51-E1.
- Kojoian, Gabriel. See Dickinson et al., A Strong Water Maser Associated with a Herbig-Haro Object. **194**, L93, 80-G4.
- Kolchin, Eleanor K. See Green and Kolchin, The Structure of Synchronously Rotating Close Binaries Built on Polytropic Model $\nu = 3$. **194**, 757, 84-B12.; Suppl. **28**, 449 (No. 271).
- Kondo, Y. See Morgan et al., Complex Infrared Emission Features in the Spectrum of Beta Lyrae. **190**, 349, 32-A12.
- Kondo, Y. See Spear et al., Ultraviolet Spectrophotometry of Sirius from *Gemini* 12. **192**, 615, 59-D2.
- Kondo, Yoji. See McCluskey and Kondo, Orbital Elements and Absolute Dimensions of the Eclipsing System LY Aurigae. **187**, 93, 1-G12.
- Kondo, Yoji, and McCluskey, George E., Jr. A Search for Lyman-Alpha Emission in Beta Lyrae from *Copernicus*. **188**, L63, 15-F2.
- Kormendy, John, and Sargent, Wallace L. W. Tidal Effects as Criteria for Membership in Small Groups of Galaxies: Application to VV 166. **193**, 19, 63-B9.
- Kozlovsky, B. See Fisk et al., An Interpretation of the Observed Oxygen and Nitrogen Enhancements in Low-Energy Cosmic Rays. **190**, L35, 30-F14.
- Kozlovsky, B. See Ramaty and Kozlovsky, Deuterium, Tritium, and Helium-3 Production in Solar Flares. **193**, 729, 72-C1.
- Kozlovsky, B., and Ramaty, R. 478-keV and 431-keV Line Emissions from Alpha-Alpha Reactions. **191**, L43, 42-D1.
- Kraft, Robert P. See Langer et al., FG Sagittae: The s-Process Episode. **189**, 509, 26-B5.
- Krall, N. A. See Smith and Krall, The Impossibility of Plasma Radiation from Electron Plasma Wave Turbulence within Collisionless Shock Waves. **194**, L163, 84-G8.
- Krall, Nicholas A. See Rose et al., Penetration of a Low-Frequency Magnetic Wave into a Nebula Plasma. **191**, 201, 41-A3.
- Kraus, J. D. See Andrew et al., Spectra of Some Ohio Radio Sources: List IV (Erratum). **189**, 165, 20-E12.
- Kraushaar, W. L. See Williamson et al., Observations of Features in the Soft X-Ray Background Flux. **193**, L133, 73-A1.
- Krieger, A. S. See Golub et al., Solar X-Ray Bright Points. **189**, L93, 24-G5.
- Krishna Swamy, K. S., and Stecher, Theodore P. Non-LTE H₂^{*} as the Source of Missing Opacity in the Solar Atmosphere. **194**, L153, 84-F12.
- Kristian, Jerome, Sandage, Allan, and Karem, Basil. On the Systematic Optical Identification of the Remaining 3C Radio Sources. I. A Search in 47 Fields. **191**, 43, 39-C12.
- Kronberg, P. P. See Wardle and Kronberg, The Linear Polarization of Quasi-stellar Radio Sources at 3.71 and 11.1 Centimeters. **194**, 249, 77-C14.
- Kronberg, Philipp P. See Vallee and Kronberg, Observations at Wavelengths of 2.2 and 4.5 Centimeters of the Linear Polarization of Radio Galaxies and Quasars. **193**, 303, 67-A13.
- Krupp, Brian M. A New Analysis of the A²Δ-X²|| System of CH. **189**, 389, 24-C5.
- Krzeminski, W. The Identification and UBV Photometry of the Visible Component of the Centaurus X-3 Binary System. **192**, L135, 61-G2.
- Kukolich, S. G. See Gaines et al., Beam Maser Measurements of CH₃OH Rotational Transitions. **191**, L99, 46-E1.
- Kumar, Shailendra. See Paresce et al., Further Evidence for an Interstellar Source of Nighttime He I 584 Å Radiation. **188**, L71, 15-F8.
- Kumar, Shailendra. See Paresce et al., Observations of He I 584 Å Nighttime Radiation: Evidence for an Interstellar Source of Neutral Helium. **187**, 633, 9-A12.
- Kunasz, C. V. See Crandall et al., Rate Coefficient for Electron Excitation of the First Resonance Transition in H, Li, Na, Ca, Ca⁺, and Ba⁺ Calculated from Experimental Data. **191**, 789, 48-G5.
- Kurucz, Robert L. Stellar Spectral Synthesis in the Ultraviolet. **188**, L21, 12-D6.
- Kutner, M. L. See Tucker et al., The Ethynyl Radical C₂H: A New Interstellar Molecule. **193**, L115, 72-F9.
- Kutter, G. S., and Sparks, Warren M. Studies of Hydrodynamic Events in Stellar Evolution. III. Ejection of Planetary Nebulae. **192**, 447, 56-B9.
- Kwan, John. Radiative Relaxation of Hyperfine Populations. **191**, 101, 40-A12.
- Kwan, John. See Goldreich and Kwan, Astrophysical Masers. IV. Line Widths. **190**, 27, 28-C1.
- Kwan, John. See Goldreich and Kwan, Astrophysical Masers. V. Pump Mechanism for H₂O Masers. **191**, 93, 40-A4.
- Kwan, John. See Goldreich and Kwan, Molecular Clouds. **189**, 441, 25-D7.
- Kwan, John. See Kirshner and Kwan, Distances to Extragalactic Supernovae. **193**, 27, 63-C1.
- Kwan, John, and Scoville, Nick. Radiative Trapping and Population Inversions of the SiO Masers. **194**, L97, 80-G7.
- Kwan, John, and Thuan, T. X. The Interpretation of the Interferometric Maps of H₂O Masers near H II Regions. **194**, 293, 77-G2.
- Labeyrie, A., Bonneau, D., Stachnik, R. V., and Gezari, D. Y. Speckle Interferometry. III. High-Resolution Measurements of Twelve Close Binary Systems. **194**, L147, 84-F5.
- Lada, C. J. See Chaisson and Lada, Recombination Lines from H I Gas toward Orion A. **189**, 227, 22-E3.
- Lada, C. J., Gottlieb, C. A., Litvak, M. M., and Lilley, A. E. Molecular Studies of Two Dark Nebulae Associated with Herbig-Haro Objects. **194**, 609, 82-F6.
- Lada, Charles, Dickinson, Dale F., and Penfield, Hays. Discovery and CO Observations of a New Molecular Source near M17. **189**, L35, 21-B4.
- Lafferty, Donald L. A Note on Ionization Equilibrium. **187**, 209, 3-A7.
- Lamb, D. Q. DQ Herculis: Weak Sister to HZ Herculis. **192**,

- L129, 61-F11.
- Lamb, D. Q. See Avni et al., Upper Limit on 2.5-Second Pulsations from Hercules X-1, **188**, L35, 15-D6.
- Lambert, D. L. See Barnes et al., Infrared Spectra of γ^2 Velorum and ζ Puppis, **187**, 73, 1-F1.
- Lambert, D. L. See Danks et al., The $^{12}\text{C}/^{13}\text{C}$ Ratio in Comet Kohoutek (1973f), **194**, 745, 84-B1.
- Lambert, D. L. See Tomkin and Lambert, The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. III. Alpha Tauri, Beta Geminorum, and Mu Leonis, **193**, 631, 71-C1.
- Lambert, D. L., Dearborn, D. S., and Sneden, C. The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. II. CN and CO in Alpha Orionis, **193**, 621, 71-B4.
- Lambert, D. L., Sneden, C., and Ries, L. M. The Oxygen Abundance in the Metal-deficient Star HD 122563, **188**, 97, 11-A9.
- Lambert, David L., and Tomkin, Jocelyn. The $^{12}\text{C}/^{13}\text{C}$ Ratio in the Atmosphere of the K2 Supergiant Epsilon Pegasi, **194**, L89, 80-G1.
- Lampton, Michael. See Bowyer et al., Observation of X-Ray Emission from M31, **190**, 285, 31-D5.
- Lampton, Michael. See Crudace et al., On the Opacity of the Interstellar Medium to Ultrasoft X-Rays and Extreme-Ultraviolet Radiation, **187**, 497, 7-F1.
- Lampton, Michael. See Margon et al., A Search for a Cosmological Component of the Soft X-Ray Background in the Direction of M31, **191**, L117, 49-B3.
- Landsberg, P. T., and Pathria, R. K. Cosmological Parameters for a Restricted Class of Closed Big-Bang Universes, **192**, 577, 59-A4.
- Landstreet, J. D. See Angel and Landstreet, A Determination by the Zeeman Effect of the Magnetic Field Strength in the White Dwarf G99-37, **191**, 457, 44-E12.
- Landstreet, J. D., and Angel, J. R. P. The Wavelength Dependence of Circular Polarization in GD 229, **190**, L25, 30-F1.
- Lang, Kenneth R. The Small-Scale, Quasi-periodic, Disk Component of Solar Radio Radiation, **192**, 777, 61-A2.
- Langer, G. E., Kraft, Robert P., and Anderson, Kurt S. FG Sagittae: The s -Process Episode, **189**, 509, 26-B5.
- Langer, William D. See Glassgold and Langer, Model Calculations for Diffuse Molecular Clouds, **193**, 73, 63-F5.
- Lapedes, Alan S. See Hartmann and Lapedes, The Absence of Radio Emission from HZ Herculis, **190**, L67, 33-G5.
- Larson, Harold P. See Fink et al., A New Upper Limit for an Atmosphere of CO_2 , CO on Mercury, **187**, 407, 5-G2.
- Larson, Richard B., and Tinsley, Beatrice M. Photometric Properties of Model Spherical Galaxies, **192**, 293, 54-D11.
- Lasker, Barry M. See Hesser et al., High-Frequency Stellar Oscillations. X. The Rapid Blue Variable CD-42°14462, **189**, 315, 23-D14.
- Lattimer, James M., and Schramm, David N. Black-Hole-Neutron-Star Collisions, **192**, L145, 61-G11.
- Laughlin, C., and Victor, G. A. Multiplet Splittings and $^{1\text{S}0-3\text{P}1}$ Intercombination-Line Oscillator Strengths in Be I and Mg I, **192**, 551, 57-B12.
- Lauterborn, D., and Siquig, R. Multiple Solutions and Secular Stability of a $7 M_\odot$ Star with Core Helium and Shell Hydrogen Burning, **187**, 299, 4-F12.
- Lauterborn, D., and Siquig, R. A. Island Solutions in Linear Series of Static Stellar Models with Core Helium and Shell Hydrogen Burning for $M = 5, 7$, and $9 M_\odot$, **191**, 589, 45-G11.
- Lazcano-Araujo, A. See Torres-Peimbert et al., Ionization of the Low Density Interstellar Medium, **191**, 401, 44-A12.
- Leacock, R. J. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, **191**, 51, 39-E1.
- Lebovitz, N. R. The Fission Theory of Binary Stars. II. Stability to Third-Harmonics Disturbances, **190**, 121, 29-B12.
- Lecar, M. See Wheeler et al., Neutron Stars in Close Binary Systems, **192**, L71, 57-F4.
- Leckrone, David S. Ultraviolet Photometry from the Orbiting Astronomical Observatory. XV. The Strongly Magnetic Variable HD 215441, **190**, 319, 31-F10.
- Leckrone, David S. See Boesgaard, et al., The Abundance of Boron and Beryllium in Alpha Lyrae, **194**, L143, 84-F1.
- Lee, Jong-Sen. Monte Carlo Simulation of Emission Frequencies from Partial Frequency Redistribution Functions, **192**, 465, 56-C11.
- Lee, Jong-Sen. Monte Carlo Simulation of Voigt Distribution in Photon-Diffusion Problems, **187**, 159, 2-E4.
- Lee, M. A., and Lerche, I. On the Passage of Radiation through Inhomogeneous, Moving Media. XI. Nonlinear Effects on Ray Paths in the Geometrical Optics Approximation, **194**, 409, 79-B4.
- Lee, Martin A. On the Passage of Radiation through Inhomogeneous, Moving Media. VIII. Ray Paths and Fluxes in a Plane Differentially Sheared Medium, **194**, 165, 75-F6.
- Lee, P., Aller, L. H., Kaler, J. B., and Czyzak, S. J. Spectrophotometric Studies of Gaseous Nebulae. XXIII. The Planetary Nebula NGC 6803, **192**, 159, 51-D10.
- Lee, Paul. An Analysis of the CH Star HD 198269, **192**, 133, 51-B13.
- Lee, Tong Nyong. Solar-Flare and Laboratory Plasma Phenomena, **190**, 467, 33-C3.
- Leep, D. See Crandall et al., Rate Coefficients for Electron Excitation of the First Resonance Transition in H, Li, Na, Ca, Ca^+ , and Ba^+ Calculated from Experimental Data, **191**, 789, 48-G5.
- Leep, Eva M. See Conti and Leep, Spectroscopic Observations of O-Type Stars. V. The Hydrogen Lines and $\lambda 4686 \text{ He II}$, **193**, 113, 64-B2.
- Lees, R. M. See Haque et al., Microwave Spectrum of ^{13}C Methanol, **187**, L15, 3-B13.
- Lerche, I. A Note on Summing Series of Bessel Functions Occurring in Certain Plasma Astrophysical Situations, **190**, 165, 29-E12.
- Lerche, I. On the Passage of Radiation through Inhomogeneous, Moving Media. I. The Plane, Differentially Sheared Medium, **187**, 589, 8-E11.
- Lerche, I. On the Passage of Radiation through Inhomogeneous, Moving Media. III. The Steady-State Fields of Inertial Charge Distributions, **188**, 627, 17-G3.
- Lerche, I. On the Passage of Radiation through Inhomogeneous, Moving Media. IV. Radiative Transfer under Single-Particle Compton Scattering, **191**, 191, 40-G8.
- Lerche, I. On the Passage of Radiation through Inhomogeneous, Moving Media. V. Line Absorption and Frequency Variations of Optical Depth, **191**, 753, 48-D13.
- Lerche, I. On the Passage of Radiation through Inhomogeneous, Moving Media. VI. Dispersion Effects on Phase and Ray Paths in a Plane, Differentially Shearing Medium, **191**, 759, 48-E4.
- Lerche, I. On the Passage of Radiation through Inhomogeneous, Moving Media. VII. Concerning the Validity of the Geometrical Optics Approximation, **191**, 763, 48-E8.
- Lerche, I. On the Passage of Radiation through Inhomogeneous, Moving Media. IX. An Initial-Value Problem and an Oscillatory "Steady-State" Problem, **194**, 177, 75-G3.
- Lerche, I. On the Passage of Radiation through Inhomogeneous, Moving Media. X. Ray and Phase Paths in Arbitrary Velocity Fields, **194**, 403, 79-A12.
- Lerche, I. See Lee and Lerche, On the Passage of Radiation through Inhomogeneous, Moving Media. XI. Nonlinear Effects on Ray Paths in the Geometrical Optics Approximation, **194**, 409, 79-B4.
- Lerche, Ian. A Variational Approach to Charged-Particle Transport, **193**, 711, 72-A12.
- Lerche, Ian. On the Passage of Radiation through Inhomogeneous, Moving Media. II. The Rotating, Differentially Shearing Medium, **187**, 597, 8-F5.
- Levine, A. See Spada et al., Limits on Rapid X-Ray Pulsing in X-Ray Binaries, **190**, L113, 37-F10.
- Levine, Randolph H. Acceleration of Thermal Particles in Collapsing Magnetic Regions, **190**, 447, 33-A11.
- Levine, Randolph H. A New Theory of Coronal Heating, **190**, 457, 33-B8.
- Levine, Randolph H. See Nakagawa and Levine, Dynamics of the

- Solar Magnetic Field. II. The Energy Spectrum of Large-Scale Solar Magnetic Fields. **190**, 441, 33-A5.
- Levine, Randolph H., and Nakagawa, Y. Dynamics of the Solar Magnetic Field. III. Location of Solar-Flare Excitation and the Velocity Field Determined from Magnetograms. **190**, 703, 37-B6.
- Levy, E. H., and Rose, W. K. Production of Magnetic Fields in the Interiors of Stars and Several Effects on Stellar Evolution. **193**, 419, 68-C3.
- Levy, Eugene H. Dynamical Stability of Stationary-Dynamo Magnetic Fields. **187**, 361, 5-D2.
- Levy, Saul G. See Abt and Levy, Period Variation of the Cepheid Zeta Geminorum. **188**, L75, 15-F11.
- Levy, Saul G. See Abt and Levy, Reinvestigation of Certain Long-Period A-Type Binaries. **188**, 291, 13-F13.
- Lew, H. See Wehinger et al., Identification of H_2O^+ in the Tail of Comet Kohoutek (1973f). **190**, L43, 30-G6.
- Lewin, W. H. G. See Heinz et al., OSO-7 Observations of a High-Latitude X-Ray Source Associated with Abell Cluster A2052. **188**, L41, 15-D11.
- Lewin, W. H. G. See McClintock et al., A Ten-Day Observation of Hercules X-1 from the OSO-7 Satellite. **188**, 159, 11-E9.
- Lewin, W. H. G. See Sprott et al., Limit on X-Ray Emission from a Supernova during Maximum Light. **191**, 739, 48-C13.
- L'Heureux, Jacques. Cosmic Gamma-Ray Burst Detected with an Instrument on Board the OGO-5 Satellite. **187**, L53, 6-B5.
- Li, F. K. See Canizares et al., OSO-7 Observations of Circinus X-1. **191**, L75, 46-C3.
- Li, Fuk Kwok, and Clark George W. Observation of an Absorption Dip in the X-Ray Intensity of Cygnus X-1. **191**, L27, 42-C3.
- Liang, E. P. T. See Bowers and Liang, Anisotropic Spheres in General Relativity. **188**, 657, 18-B3.
- Lichti, G. See Schönfelder and Lichti, Energy Spectrum and Evidence for Extragalactic Origin of Diffuse Gamma-Radiation in the MeV Range. **191**, L1, 42-A2.
- Lichti, G. See Schönfelder and Lichti, Upper Limits to Soft Gamma-Ray Flux from Seven X-Ray Sources and from the Galactic Plane. **192**, L1, 53-A2.
- Liewer, K. M. See Currie et al., Four Stellar-Diameter Measurements by a New Technique: Amplitude Interferometry. **187**, 131, 2-C5.
- Liewer, Paulett C. See Rose et al., Penetration of a Low-Frequency Magnetic Wave into a Nebula Plasma. **191**, 201, 41-A3.
- Light, E. S., Danielson, R. E., and Schwarzschild, M. The Nucleus of M31. **194**, 257, 77-D7.
- Lightman, Alan P. Time-dependent Accretion Disks around Compact Objects. I. Theory and Basic Equations. **194**, 419, 79-B13.
- Lightman, Alan P. Time-dependent Accretion Disks around Compact Objects. II. Numerical Models and Instability of Inner Region. **194**, 429, 79-C8.
- Lightman, Alan P., and Eardley, Douglas M. Black Holes in Binary Systems: Instability of Disk Accretion. **187**, L1, 3-B2.
- Liller, W. Optical Studies of *Uhuru* Sources. X. The Photometric History of He 2-177 (= 3U 1639-62?). **192**, L89, 57-G6.
- Liller, W. See Jones et al., Optical Studies of *Uhuru* Sources. VIII. Observations of 92 Possible Counterparts of X-Ray Sources. **190**, L1, 30-D4.
- Liller, W. See Elliot et al., The Occultation of Beta Scorpii by Jupiter. II. The Hydrogen-Helium Abundance in the Jovian Atmosphere. **190**, 719, 37-C6.
- Liller, Wm. The Photometric History of the Object Identified with PKS 0537-441. **189**, L101, 27-C3.
- Lilley, A. E. See Black et al., Radiofrequency Emission from CH in Comet Kohoutek (1973f). **191**, L45, 42-D3.
- Lilley, A. E. See Lada et al., Molecular Studies of Two Dark Nebulae Associated with Herbig-Haro Objects. **194**, 609, 82-F6.
- Limber, D. Nelson. Steady-State Mass Loss for Be Stars. **192**, 429, 56-A5.
- Lin, C. D. Theoretical Analysis of the Al I Absorption Spectrum. **187**, 385, 5-E10.
- Lindsey, C. A. See Hudson and Lindsey, Direct Observation of Temperature Amplitude of Solar 300-Second Oscillations. **187**, L35, 3-D4.
- Lindstrom, P. J. See Golden et al., Rigidity Spectrum of $Z \geq 3$ Cosmic-Ray Nuclei in the Range 4 to 285 GV and a Search for Cosmic Antimatter. **192**, 747, 60-F3.
- Lineberger, W. C. See Herbst et al., Is H α a Source of Diffuse Interstellar Lines? **191**, L143, 49-C11.
- Linke, R. A., and Wannier, P. G. Kinematics of the Orion A Molecular Cloud. **193**, L41, 66-C11.
- Linsky, J. L. See Moos et al., High-Spectral-Resolution Measurements of the H I λ 1216 and Mg II λ 2800 Emissions from Arcturus. **188**, L93, 18-D5.
- Linsky, Jeffrey L. See Ayres et al., Stellar Model Chromospheres. II. Procyon (F5 IV-V). **192**, 93, 50-G7.
- Linsky, Jeffrey L. See Gerola et al., Evidence for a Corona of Beta Geminorum. **193**, L107, 72-F1.
- Liszt, H. S., Wilson, R. W., Penzias, A. A., Jefferts, K. B., Wannier, P. G., and Solomon, P. M. CO and CS in the Orion Nebula. **190**, 557, 35-E8.
- Little, Stephen J. The Peculiar A Star HD 168733. II. A Model-Atmosphere Analysis. **193**, 639, 71-C8.
- Littleton, J. E., and Buchler, J.-R. Electron-Ion Relaxation in a Dense Plasma. **191**, 731, 48-C5.
- Litvak, M. M. See Harvey et al., Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H α CO Emission. **189**, L87, 24-F13.
- Litvak, M. M. See Lada et al., Molecular Studies of Two Dark Nebulae Associated with Herbig-Haro Objects. **194**, 609, 82-F6.
- Liu, Sou-Yang. Direct Observational Evidence for the Propagation and Dissipation of Energy in the Chromosphere. **189**, 359, 24-A1.
- Lo, K. Y., and Bechis, Kenneth P. The V1057 Cygni OH Source: Time Variation, Polarization Properties, and Accurate Position. **190**, L125, 37-G5.
- Lockhart, I. A. See Rogstad et al., Aperture-Synthesis Observations of H I in the Galaxy M83. **193**, 309, 67-B7.
- Lockman, Felix J. See Gordon et al., Radio Recombination Lines at a Wavelength of 78 Centimeters. **192**, 337, 55-A4.
- Lockwood, G. W. Near-Infrared Photometry of Unidentified IRC Stars. II. **192**, 113, 51-A12.
- Lockwood, G. W. Stellar Energy Distributions in an Infrared Cluster in Ara. **193**, 103, 64-A7.
- Lockwood, G. W. See Dyck et al., Infrared Fluxes, Spectral Types, and Temperatures for Very Cool Stars. **189**, 89, 19-G7.
- Lodenquai, J., Canuto, V., Ruderman, M., and Tsuruta, S. Photon Opacity in Surfaces of Magnetic Neutron Stars. **190**, 141, 29-D3.
- Longmore, A. J. See Jameson et al., Infrared Emission by Dust in NGC 1068 and Three Planetary Nebulae. **190**, 353, 32-B2.
- Longmore, A. J. See Jameson et al., Infrared Spectrum of NGC 1068. **187**, L109, 9-E2.
- Loren, Robert B., Peters, William L., and Vanden Bout, Paul A. Collapsing Molecular Clouds?. **194**, L103, 81-A1.
- Lorre, Jean. See Herbig and Lorre, Structure of the OH/Infrared Object NML Cygnus. I. Analysis of the Near-Infrared Image. **189**, 73, 19-F7.
- Loumos, Gregory L. See Couch and Loumos, The Urca Process in Dense Interstellar Interiors. **194**, 385, 78-G9.
- Lovas, F. J. See Snyder et al., Radio Detection of Interstellar Dimethyl Ether. **191**, L79, 46-C7.
- Lovas, Frank J. Small Silicon Molecules: Possible Sources of the Unidentified Molecular Lines U81.5, U86.2, U89.2, and U90.7. **193**, 265, 65-E9.
- Lovas, Frank J. See Buhl et al., Silicon Monoxide: Detection of Maser Emission from the Second vibrationally Excited State. **192**, L97, 58-A1.
- Low, B. C. Resistive Diffusion of Force-free Magnetic Fields in a Passive Medium. III. Acceleration of Flare Particles. **189**, 353, 23-G7.

- Low, B. C. Resistive Diffusion of Force-free Magnetic Fields in a Passive Medium. IV. The Dynamical Theory, **193**, 243, 65-D2.
- Low, F. J. See Fazio et al., A High-Resolution Map of the Orion Nebula Region at Far-Infrared Wavelengths, **192**, L23, 53-B8.
- Low, F. J. See Rieke and Low, Infrared Measurements of Uranus and Neptune, **193**, L147, 73-B1.
- Low, F. J., and Rieke, G. H. Infrared Photometry of Titan, **190**, L143, 38-A7.
- Lucke, Peter B. The OB Stellar Associations in the Large Magellanic Cloud, **192**, 573, 57-D5; Suppl. **28**, 73 (No. 255).
- Lutz, Barry L. Neutral Potassium in Dusty Clouds, **191**, L131, 49-C1.
- Lutz, Barry L. See Owen et al., On the Identification of the 6420 Å Absorption Feature in the Spectra of Uranus and Neptune, **189**, 379, 24-B10.
- Lutz, Barry L., and Owen, Tobias. The Search for HD in the Spectrum of Uranus: An Upper Limit to [D/H], **190**, 731, 37-D3.
- Lutz, Barry L., and Ryan, James A. Silicon Carbide: Its Ground State and Predicted Spectrum, **194**, 753, 84-B8.
- Lynch, M. See Mutel et al., VLB Observations of the Crab Nebula and the Wavelength Dependence of Interstellar Scattering, **193**, 279, 65-F9.
- Lynds, Beverly T. An Atlas of Dust and H II Regions in Galaxies, **194**, 213, 76-B17; Suppl. **28**, 391 (No. 267).
- Lyyra, M. See Brzozowski et al., On the Interstellar Abundance of the CH⁺ Radical, **193**, 741, 72-D1.
- MacAlpine, Gordon M. On QSO and Seyfert Galaxy Line-Emission Models, **193**, 37, 63-C12.
- Machado, Marcos E. See Ringuelet and Machado, Short-Period Radial-Velocity Variations in π Aquarii, **189**, 285, 23-B12.
- MacLeod, J. M. See Doherty et al., Detection of the 10.464-GHz Transition of Interstellar Thioformaldehyde, **192**, L157, 62-A9.
- Macpherson, A. K. The Structure of an H I-H II Boundary, **192**, 369, 55-C11.
- MacQueen, R. M. Eddy, J. A., Gosling, J. T., Hildner, E., Munro, R. H., Newkirk, G. A., Jr., Poland, A. I., and Ross, C. L. The Outer Solar Corona as Observed from *Skylab*: Preliminary Results, **187**, L85, 6-D7.
- Macy, W., Jr. See Tracton et al., The Spatial Extent of Sodium Emission around Io, **190**, L85, 34-A8.
- Macy, William W., Jr. Pulsar Magnetic Axis Alignment and Counteralignment, **190**, 153, 29-E1.
- Madore, Barry F., van den Berg, Sidney, and Rogstad, David H. Gas Density and the Rate of Star Formation in M33, **191**, 317, 43-C2.
- Malina, Roger. See Davidsen et al., Optical and X-Ray Observations of 3U 0614+09, **193**, L25, 66-B9.
- Maline, Robert C. See Wagoner and Maline, Post-Newtonian Neutron Stars, **189**, L75, 24-F2.
- Malone, R. C. See Katz et al., Models for Nuclei of Planetary Nebulae and Ultraviolet Stars, **190**, 359, 32-B8.
- Manchester, R. N. Structure of the Local Galactic Magnetic Field, **188**, 637, 17-G12.
- Manchester, R. N., and Taylor, J. H. Period Irregularities in Pulsars, **191**, L63, 46-B6.
- Manchester, R. N., Taylor, J. H., and Van, Y. Y. Detection of Pulsar Proper Motion, **189**, L119, 27-D6.
- Mansfield, V. N., and Salpeter, E. E. Numerical Models for Supernova Remnants, **190**, 305, 31-E10.
- Marandino, G. E. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, **193**, 293, 67-A4.
- Marar, T. M. K. See Golden et al., Rigidity Spectrum of Z≥3 Cosmic-Ray Nuclei in the Range 4 to 285 GV and a Search for Cosmic Antimatter, **192**, 747, 60-F3.
- Margon, Bruce. See Bowyer et al., Observation of X-Ray Emission from M31, **190**, 285, 31-D5.
- Margon, Bruce. See Davidsen et al., Optical and X-Ray Observations of 3U 0614+09, **193**, L25, 66-B9.
- Margon, Bruce, Bowyer, Stuart, Crudace, Ray, Heiles, Carl, Lampton, Michael, and Troland, Thomas. A Search for a Cosmological Component of the Soft X-Ray Background in the Direction of M31, **191**, L117, 49-B3.
- Margon, Bruce, Mason, Keith O., and Sanford, Peter W. A Search for Soft X-Ray Emission from Red-Giant Coronae, **194**, L75, 80-F1.
- Mark, James W.-K. On Density Waves in Galaxies. I. Source Terms and Action Conservations, **193**, 539, 70-C9.
- Marlborough, J. M. See Gray and Marlborough, Photoelectric Profile Measurements of Hα and Hβ in Be Stars, **190**, 505, 33-E7; Suppl. **27**, 121 (No. 240).
- Marlborough, J. M., and Cowley, A. P. A Model Envelope for the Shell Star 1 Delphini, **187**, 99, 2-A4.
- Marscher, Alan P. See van den Berg et al., An Optical Atlas of Galactic Supernova Remnants (Erratum to Suppl. 227), **191**, 289, 41-G3.
- Marsh, K. A., Purton, C. R., and Feldman, P. A. A Model for the Radio Bursts of Cygnus X-3, **192**, 697, 60-B9.
- Martin, P. G. Interstellar Polarization from a Medium with Changing Grain Alignment, **187**, 461, 7-C10.
- Martin, P. G. See Angel et al., G240-72: A New Magnetic White Dwarf with Unusual Polarization, **190**, L71, 33-G9.
- Martin, P. G., and Angel, J. R. P. A Study of Birefringence in the Interstellar Medium in the Direction of the Crab Nebula, **193**, 343, 67-D9.
- Martin, P. G., and Angel, J. R. P. A Study of Interstellar Polarization at the λλ4430 and 5780 Features in HD 183143, **188**, 517, 16-F4.
- Martonchik, John V. Sulfuric Acid Cloud Interpretation of the Infrared Spectrum of Venus, **193**, 495, 69-A8.
- Mason, K. O. See Becklin et al., Infrared, Radio, and X-Ray Observations of Cygnus X-3, **192**, L119, 61-E11.
- Mason, K. O. See Sanford et al., *Copernicus* Observations of Variations in the X-Ray Flux from Cygnus X-1, **190**, L55, 33-F7.
- Mason, Keith. See Davidsen et al., Optical and X-Ray Observations of 3U 0614+09, **193**, L25, 66-B9.
- Mason, Keith O. See Margon et al., A Search for Soft X-Ray Emission from Red-Giant Coronae, **194**, L75, 80-F1.
- Mason, Keith O., Hawkins, Frederick J., Sanford, Peter W., Murdin, Paul, and Savage, Ann. X-Ray Absorption Events in Cygnus X-1 Observed with *Copernicus*, **192**, L65, 57-E13.
- Massa, L. J. See Harrison et al., Hartree-Fock Bound States for Molecule-Ions HeC⁺⁺ and HeC⁻, **189**, 605, 27-B2.
- Mast, Terry S., Nelson, Jerry E., and Saarloos, John A. Search for Gravitational Radiation from Pulsars, **187**, L49, 6-B2.
- Mather, J. See Thaddeus et al., Detection of the J = 1→0 Rotational Transition of vibrationally excited Silicon Monoxide, **192**, L33, 53-C3.
- Mathews, William G. Radiative Acceleration of Gas Clouds near Quasi-stellar Objects and Seyfert Galaxy Nuclei, **189**, 23, 19-B12.
- Mathewson, D. S., Cleary, M. N., and Murray, J. D. The Magellanic Stream, **190**, 291, 31-D9.
- Mathis, John S. See Schiffer and Mathis, The Scattering by Dust in the Orion Nebula, **194**, 597, 82-E8.
- Matilsky, T. See Canizares et al., A Search for X-Rays from Supernova 1972c with *Uhuru* and OSO-7, **192**, L61, 57-E10.
- Matilsky, T. See Giacconi et al., The Third *Uhuru* Catalog of X-Ray Sources, **188**, 667, 18-B12; Suppl. **27**, 37 (No. 237).
- Matilsky, T. A. See Holt et al., On the Nature of the Unidentified High-Latitude *Uhuru* Sources, **188**, L97, 18-D8.
- Matsakis, D. See Chui et al., The Methanol Source in Orion at 1.2 Centimeters, **187**, L19, 3-C2.
- Matson, Dennis L., Johnson, Torrence V., and Fanale, Fraser P. Sodium D-Line Emission from Io: Sputtering and Resonant Scattering Hypothesis, **192**, L43, 53-D1.
- Matthews, K. See Becklin et al., Infrared, Radio, and X-Ray Observations of Cygnus X-3, **192**, L119, 61-E11.
- Matthews, K. See Gatley et al., A New Infrared Complex and Molecular Cloud in Orion, **191**, L121, 49-B6.

- Matthews, K. See Zappala et al., Angular Diameter of IRC+10011 at 2.2, 10, and 20 Microns, 192, 109, 51-A8.
- Matthews, Keith. See Westphal et al., Five-Micron Pictures of Jupiter, 188, L111, 18-E6.
- Mavko, G. E., Hayes, D. S., Greenberg, J. M., and Hiltner, W. A. Observations of Structure in the Interstellar Polarization Curve: Preliminary Results, 187, L117, 9-E9.
- Mayer, C. H. See Waak and Mayer, The H₂O Source in Sagittarius B2, 189, 67, 19-F1.
- McCammon, D. See Williamson et al., Observations of Features in the Soft X-Ray Background Flux, 193, L133, 73-A1.
- McClintock, J. See Rappaport et al., Possible Detection of Very Soft X-Rays from SS Cygni, 187, L5, 3-B5.
- McClintock, J. E. See Canizares and McClintock, Upper Limits to Optical Pulsations from Centaurus X-3, 193, L65, 69-C10.
- McClintock, J. E., Clark, G. W., Lewin, W. H. G., Schnopper, H. W., Canizares, C. R., and Sprott, G. F. A Ten-Day Observation of Hercules X-1 from the OSO-7 Satellite, 188, 159, 11-E9.
- McClintock, W. See Gerola et al., Evidence for a Corona of Beta Geminorum, 193, L107, 72-F1.
- McClintock, W. See Moos et al., High-Spectral-Resolution Measurements of the H I λ 1216 and Mg II λ 2800 Emissions from Arcturus, 188, L93, 18-D5.
- McClure, Robert D. Possible Abundance Differences among Giant Stars in NGC 188, 194, 355, 78-E6.
- McClure, Robert D. See Hartwick and McClure, Physical Characteristics of Giant Stars in the Draco Dwarf Spheroidal Galaxy, 193, 321, 67-C3.
- McClure, Robert D., Forrester, William T., and Gibson, James. The Old Open Cluster NGC 2420, 189, 409, 25-A14.
- McClure, Robert D., and Norris, John. Physical Characteristics of Giant Stars in the Anomalous Globular Cluster NGC 362, 193, 139, 64-D1.
- McClure, Robert D., and Osborn, Wayne. Cyanogen-Band Strengths of Giant Stars in 47 Tucanae, 189, 405, 25-A11.
- McCluskey, George E., Jr. See Kondo and McCluskey, A Search for Lyman-Alpha Emission in Beta Lyrae from *Copernicus*, 188, L63, 15-F2.
- McCluskey, George E., Jr., and Kondo, Yoji. Orbital Elements and Absolute Dimensions of the Eclipsing System LY Aurigae, 187, 93, 1-G12.
- McCray, R. See Kafatos et al., Ionization of Carbon and Nitrogen in the Intercloud Medium, 187, L113, 9-E5.
- McCray, Richard. See Buff and McCray, Accretion Flow in Galactic X-Ray Sources. I. Optical Thin Spherically Symmetric Model, 189, 147, 20-D10.
- McCray, Richard. See Buff and McCray, Soft X-Ray Variability of Binary X-Ray Stars, 188, L37, 15-D7.
- McCray, Richard. See Gerola et al., Statistical Time-dependent Model for the Interstellar Gas, 189, 55, 19-E1.
- McCrosky, R. E. See Grindlay et al., Search for Optical Emission from Cosmic Gamma-Ray Bursts, 192, L113, 61-E6.
- McDonald, F. B., Teegarden, B. J., Trainor, J. H., and Webber, W. R. The Anomalous Abundance of Cosmic-Ray Nitrogen and Oxygen Nuclei at Low Energies, 187, L105, 9-D12.
- McElroy, Michael B., Yung, Yuk Ling, and Brown, Robert A. Sodium Emission from Io: Implications, 187, L127, 9-F3.
- McGee, J. D. See Walker et al., Direct Electronographic Observations of Luminous Connections between Galaxies with Discordant Redshifts, 194, L125, 84-D8.
- McGimsey, B. Q. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, 191, 51, 39-E1.
- McKee, C. F. See Wheeler et al., Neutron Stars in Close Binary Systems, 192, L71, 57-F4.
- McKee, Christopher F. X-Ray Emission from an Inward-propagating Shock in Young Supernova Remnants, 188, 335, 14-B13.
- McKee, Christopher F. See Aaronson et al., A Search for Molecular Hydrogen in Quasar Absorption Spectra, 191, L53, 46-A10.
- McKee, Christopher F., and Petrosian, Vahé. Are Quasars Dusty?, 189, 17, 19-B7.
- McLinn, J. A. See Jameson et al., Infrared Emission by Dust in NGC 1068 and Three Planetary Nebulae, 190, 353, 32-B2.
- McLinn, J. A. See Jameson et al., Infrared Spectrum of NGC 1068, 187, L109, 9-E2.
- McNall, J. F. See Doherty et al., Ultraviolet Photometry from the Orbiting Astronomical Observatory. XI. The 1971 Eclipse of 32 Cygni, 187, 521, 8-A1.
- Medd, W. J. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, 191, 51, 39-E1.
- Meerts, W. L., and Dymanus, A. The Hyperfine A-Doubling Spectrum of Sulfur Hydride in the $^2\Pi^{3/2}$ State, 187, L45, 3-D12.
- Mehlman, G., and Esteva, J. M. Autoionization Spectra of Beryllium (Be I and Be II) in the 110- to 140-eV Energy Range, 188, 191, 12-A1.
- Mehlman, G. See Esteva and Mehlman, Autoionization Spectra of Magnesium (Mg I, Mg II, and Mg III) in the 50- to 110-eV Energy Range, 193, 747, 72-D7.
- Meier, R. R. See Weller and Meier, Observations of Helium in the Interplanetary/Interstellar Wind: The Solar-Wake Effect, 193, 471, 68-F13.
- Mekler, Yu., and Evitar, A. Spectroscopic Observations of Io, 193, L151, 73-B5.
- Meloy, Debra Anne. See Jenkins and Meloy, A Survey with *Copernicus* of Interstellar O VI Absorption, 193, L121, 72-G1.
- Méndez, Roberto H. See Niemelä and Méndez, Emission Lines in the Spectrum of Zeta Ophiuchi, 187, L23, 3-C5.
- Mengel, John G. See Demarque et al., Rotating Solar Models with Low Neutrinos Flux (Erratum), 187, 423, 6-A4.
- Merrill, K. M. See Stein et al., Observations of the Infrared Radiation from the Nuclei of NGC 1068 and NGC 4151, 187, 213, 4-A3.
- Merrill, K. M., and Soifer, B. T. Spectrophotometric Observations of a Highly Absorbed Object in Cygnus, 189, L27, 21-A11.
- Messina, R. J. See Mook et al., Color Variations of Scorpius X-1, 191, 493, 45-A2.
- Mészáros, P. Ionization Mechanisms of the Intercloud Medium, 191, 79, 39-G4.
- Metzger, A. E. See Trombka et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. II. X-Ray Time Profile and Source Location, 194, L27, 76-E2.
- Metzger, A. E., Parker, R. H., Gilman, D., Peterson, L. E., and Trombka, J. I. Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. I. Temporal Variability and Energy Spectrum, 194, L19, 76-D9.
- Mewaldt, R. A. See Hurford et al., The Energy Spectrum of 0.16 to 2 MeV Electrons during Solar Quiet Times, 192, 541, 57-B2.
- Michalsky, J. J., Jr., Swedlund, J. B., Stokes, R. A., and Avery, R. W. Interstellar Circular Polarization: A Report of Eight New Positive Results, 187, L13, 3-B11.
- Michalsky, Joseph J., Jr. See Swedlund et al., Discovery of Time-Varying Circular and Linear Polarization in the White-Dwarf Suspect GD 229, 187, L121, 9-E12.
- Michel, F. C. Reply to "Comment on 'Galactic Magnetic Fields: Cellular or Filamentary Structure?'". 187, 193, 2-G5.
- Michel, F. Curtis. Rotating Magnetosphere: Acceleration of Plasma from the Surface, 192, 713, 60-C10.
- Michel, F. Curtis. Rotating Magnetosphere: Far-Field Solutions, 187, 585, 8-E7.
- Michel, Guy. See Connes and Michel, High-Resolution Fourier Spectra of Stars and Planets, 190, L29, 30-F5.
- Mies, Frederick H. Ultraviolet Fluorescent Pumping of OH 18-Centimeter Radiation in Comets, 191, L145, 49-C13.
- Mihalas, Dimitri. See Heasley et al., Theoretical Helium I Emission-Line Intensities for Quiescent Prominences, 192, 181, 51-F4.
- Mihalas, Dimitri. See Milkey and Mihalas, Resonance-Line Transfer with Partial Redistribution. II. The Solar Mg II Lines, 192, 769, 60-G8.
- Mihalas, Dimitri, Barnard, A. J., Cooper, J., and Smith, E. W. He I $\lambda\lambda 4471$ Profiles in B Stars: Calculations with an Improved Line-broadening Theory, 190, 315, 31-F6.
- Mihalas, Dimitri, and Hummer, D. G. Theory of Extended Stellar

- Atmospheres. I. Computational Method and First Results for Static Spherical Models, **193**, 503, 69-B1; Suppl. **28**, 343 (No. 265).
- Mihalas, Dimitri, and Hummer, David G. Some Observational Implications of Extended Static O-Star Model Atmospheres, **189**, L39, 21-B9.
- Mikkelsen, David R., and Wallerstein, George. Limitations on the Masses and Other Dimensions of the Binary HD 77581, **194**, 459, 79-E9.
- Milkey, R. W. See Johnson et al., Formation of the Luminosity-sensitive O I Multiplet at 7774 Å, **187**, 147, 2-D7.
- Milkey, R. W., and Mihalas, Dimitri. Resonance-Line Transfer with Partial Redistribution. II. The Solar Mg II Lines, **192**, 769, 60-G8.
- Miller, Bonnie D. The Effect of Gravitational Radiation-Reaction on the Evolution of the Riemann S-Type Ellipsoids, **187**, 609, 8-G2.
- Miller, Joseph S. Photoelectric Spectrophotometry of the Cygnus Loop, **189**, 239, 22-F1.
- Miller, R. H. On the Stability of a Disk Galaxy, **190**, 539, 35-D4.
- Milman, Andrew S. Why $^{12}\text{C}^{16}\text{O}$ Profiles in Dark Clouds Do Not Have Flat Tops, **193**, L93, 69-E9.
- Milton, Robert L. The Effects of Rapid, Differential Rotation on the Spectra of White Dwarfs, **189**, 543, 26-D9.
- Miner, E. See Gatley et al., Infrared Observations of Phobos from *Mariner 9*, **190**, 497, 33-E2.
- Mitalas, R. Destruction of ^{14}N by $^{14}\text{N}(e^-,\nu)^{14}\text{C}(\alpha,\gamma)^{18}\text{O}$ in Degenerate Matter, **187**, 155, 2-D14.
- Mitteldorf, J. See Cowsik and Mitteldorf, Turbulence-enhanced Synchrotron Radiation in the Galaxy, **189**, 51, 19-D12.
- Moffett, T. J., Nather, R. E., and Vanden Bout, P. A. Non-periodic Optical Flickering in HZ Herculis, **190**, L63, 33-G1.
- Moffett, Thomas J. See Bopp and Moffett, High Time Resolution Studies of UV Ceti (Erratum), **191**, 289, 41-G3.
- Moffett, Thomas J., and Barnes, Thomas G., III. Rapid Light Variations of YZ Cancri: An Unusual SS Cygni Star, **194**, 141, 75-D6.
- Molnar, Michael R. OAO-2 Observations of the Helium Spectrum Variable a Centauri, **187**, 531, 8-A11.
- Montgomery, J. A., Jr. See Green et al., Tentative Identification of U93.174 as the Molecular Ion N_2H^+ , **193**, L89, 69-E6.
- Montgomery, J. W. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, **191**, 51, 39-E1.
- Mook, D. E., Messina, R. J., Pel, J., and Hiltner, W. A. Color Variations of Scorpius X-1, **191**, 493, 45-A2.
- Moore, E. L. See Huguenin and Moore, A Search for Isolated Radiofrequency Pulses, **187**, L57, 6-B9.
- Moore, G. See Rappaport et al., Possible Detection of Very Soft X-Rays from SS Cygni, **187**, L5, 3-B5.
- Moore, W. E., Agrawal, P. C., and Garmire, G. An Upper Limit on Soft X-Ray Pulsations from the Pulsar PSR 0833-45, **189**, L117, 27-D4.
- Moos, H. W. See Gerola et al., Evidence for a Corona of Beta Geminorum, **193**, L107, 72-F1.
- Moos, H. W., Linsky, J. L., Henry, R. C., and McClintock, W. High-Spectral-Resolution Measurements of H I λ 1216 and Mg II λ 2800 Emissions from Arcturus, **188**, L93, 18-D5.
- Morgan, J. F. See Vlieks et al., Reaction Rates of Interest in Late Stages of Stellar Nucleosynthesis, **191**, 699, 48-A1.
- Morgan, T. H., Potter, A. E., and Kondo, Y. Complex Infrared Emission Features in the Spectrum of Beta Lyrae, **190**, 349, 32-A12.
- Morganstern, R. E. Dynamical Analysis of Brans-Dicke Cosmologies, **191**, 39, 39-C9.
- Mori, T. T. See Wilson et al., Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters, **191**, 357, 43-E11.
- Morimoto, M. See Fourikis et al., Detection of Interstellar Methylamine by its $2 \rightarrow 1 \rightarrow 0$ Δv -State Transition, **191**, L139, 49-C8.
- Morimoto, M. See Kaifu et al., Detection of Interstellar Methylamine, **191**, L135, 49-C5.
- Morris, Charles S. See Stoeckley and Morris, Rotational Distortion of Stellar Absorption Lines. I. Parameters from Photographic Spectra, **188**, 579, 17-C6.
- Morris, G. See Harvey et al., Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission, **189**, L87, 24-F13.
- Morris, M., Palmer, Patrick, Turner, B. E., and Zuckerman, B. Millimeter-Wavelength Molecular Lines and Far-Infrared Sources, **191**, 349, 43-E4.
- Morris, M., Zuckerman, B., Turner, B. E., and Palmer, Patrick. The New Molecular Cloud in Orion, **192**, L27, 53-B11.
- Morrison, David. Radiometric Diameters and Albedos of 40 Asteroids, **194**, 203, 76-B1.
- Morrison, Nancy D. See Wolff and Morrison, Spectroscopic Observations of HD 153919 (2U 1700-37), **187**, 69, 1-E11.
- Morrison, P. See Brecher and Morrison, Cosmic Gamma-Ray Bursts from Directed Stellar Flares, **187**, L97, 9-D6.
- Morrison, P. See Brecher and Morrison, Do Cosmic Rays Heat HZ Herculis?, **187**, 349, 5-C5.
- Morton, Donald C. Interstellar Abundances toward Zeta Ophiuchi, **193**, L35, 66-C6.
- Morton, Donald C. See Jenkins et al., Rocket-Ultraviolet Spectra of Kappa, Lambda, Tau, and Upsilon Scorpis, **194**, 77, 74-G1.
- Morton, Donald C., Smith, Andrew M., and Stecher, Theodore P. A New Limit on the Interstellar Abundance of Boron, **189**, L109, 27-C11.
- Moss, T. A., and Giuli, R. T. Monte Carlo Analysis of the Solar-Wind Modulation of Galactic C-N-O at Solar Maximum, **192**, 753, 60-F8.
- Mottman, J. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, **191**, 51, 39-E1.
- Mottman, John. See Fogarty et al., NGC 1068: Possible 3-Millimeter Radio Variability, **191**, 305, 43-B4.
- Mould, J. R. See Hyland and Mould, Lines of Neutral Barium and the Abundance of Barium in Two K Supergiants, **187**, 277, 4-E5.
- Mouschovias, Telemachos Ch. Static Equilibria of the Interstellar Gas in the Presence of Magnetic and Gravitational Fields: Large-Scale Condensations, **192**, 37, 50-C5.
- Mufson, Stuart L. The Structure and Stability of Shock Waves in a Multiphase Interstellar Medium, **193**, 561, 70-E2.
- Mullan, D. J. Starspots on Flare Stars, **192**, 149, 51-D1.
- Mullan, D. J. Sunspot Models with Alfvén Wave Emission, **187**, 621, 9-A1.
- Münch, Guido, and Taylor, Keith. On the Spectrum of Neutral Oxygen in the Orion Nebula, **192**, L93, 57-G10.
- Munro, R. H. See MacQueen et al., The Outer Solar Corona as Observed from *Skylab*: Preliminary Results, **187**, L85, 6-D7.
- Murdin, P. See Sanford et al., *Copernicus* Observations of Variations in the X-Ray Flux from Cygnus X-1, **190**, L55, 33-F7.
- Murdin, Paul. See Mason et al., X-Ray Absorption Events in Cygnus X-1 Observed with *Copernicus*, **192**, L65, 57-E13.
- Murphy, Robert E., and Trafton, Laurence M. Evidence for an Internal Heat Source in Neptune, **193**, 253, 65-D12.
- Murray, J. D. See Mathewson et al., The Magellanic Stream, **190**, 291, 31-D9.
- Murray, S. See Giacconi et al., The Third *Uhuru* Catalog of X-Ray Sources, **188**, 667, 18-B12; Suppl. **27**, 37 (No. 237).
- Murray, S. See Kellogg and Murray, Studies of Cluster X-Ray Sources: Size Measurements, **193**, L57, 69-C3.
- Murray, S. S. See Holt et al., On the Nature of the Unidentified High-Latitude *Uhuru* Sources, **188**, L97, 18-D8.
- Mutel, R. L., Broderick, J. J., Carr, T. D., Lynch, M., Desch, M., Warnock, W. W., and Klempner, W. K. VLB Observations of the Crab Nebula and the Wavelength Dependence of Interstellar Scattering, **193**, 279, 65-F9.
- Nagane, K. See Kaifu et al., Detection of Interstellar Methylamine, **191**, L135, 49-C5.
- Nagel, D. J. See Feldman et al., Laser-Plasma Spectra of Highly Ionized Fluorine, **187**, 417, 5-G11.
- Nagel, D. J. See Feldman et al., Satellite Line Spectra from

- Laser-produced Plasmas, **192**, 213, 52-A6.
- Nakagawa, Y. Dynamics of the Solar Magnetic Field. I. Method of Examination of Force-free Magnetic Fields, **190**, 437, 33-A1.
- Nakagawa, Y. See Levine and Nakagawa, Dynamics of the Solar Magnetic Field. III. Location of Solar-Flare Excitation and the Velocity Field Determined from Magnetograms, **190**, 703, 37-B6.
- Nakagawa, Y., and Levine, Randolph H. Dynamics of the Solar Magnetic Field. II. The Energy Spectrum of Large-Scale Solar Magnetic Fields, **190**, 441, 33-A5.
- Nakagawa, Y., and Tanaka, K. Dynamics of the Solar Magnetic Field. IV. Examples of Force-free Magnetic-Field Evolution in Response to Photospheric Motions, **190**, 711, 37-B13.
- Nakano, G. H. See Imhof et al., Spectra Measurements of a Cosmic Gamma-Ray Burst with Fast Time Resolution, **191**, L7, 42-A7.
- Nandy, A. Correlation Effects on the Energy Shifts of Excited Nucleons in Neutron-Star Matter, **190**, 385, 32-D5.
- Nandy, K. See Thompson et al., A Broad Absorption Region in the Ultraviolet Spectra of Early-Type Stars, **187**, L81, 6-D3.
- Nather, R. E. See Moffett et al., Nonperiodic Optical Flickering in HZ Herculis, **190**, L63, 33-B1.
- Nather, R. Edward, and Robinson, E. L. Coherent Oscillations in UX Ursae Majoris, **190**, 637, 36-D7.
- Neighbours, J. E. See Canizares et al., A Search for X-Rays from Supernova 1972e with *Uhuru* and OSO-7, **192**, L61, 57-E10.
- Nelson, Jerry E. See Mast et al., Search for Gravitational Radiation from Pulsars, **187**, L49, 6-B2.
- Neugebauer, G. See Becklin et al., The H II Region G333.6-0.2, a Very Powerful 1-20 Micron Source (Erratum), **193**, L153, 73-B7.
- Neugebauer, G. See Becklin et al., Infrared Emission from the Southern H II Region H2-3, **187**, 487, 7-E6.
- Neugebauer, G. See Becklin et al., Infrared, Radio, and X-Ray Observations of Cygnus X-3, **192**, L119, 61-E11.
- Neugebauer, G. See Gatley et al., Infrared Observations of Phobos from *Mariner 9*, **190**, 497, 33-E2.
- Neugebauer, G. See Gatley et al., A New Infrared Complex and Molecular Cloud in Orion, **191**, L121, 49-B6.
- Neugebauer, G. See Sutton et al., 34-Micron Observations of Eta Carinae, G333.6-0.2, and the Galactic Center, **190**, L69, 33-G7.
- Neugebauer, G. See Wynn-Williams et al., Infrared Studies of H II Regions and OH Sources, **187**, 473, 7-D8.
- Neugebauer, G. See Zappala et al., Angular Diameter of IRC +10011 at 2.2, 10, and 20 Microns, **192**, 109, 51-A8.
- Neupert, W. M. See Kastner et al., Solar-Flare Emission Lines in the Range from 66 to 171 Å; $2s^2 2p_k - 2s^2 1p_{k+1}$ Transitions in Highly Ionized Iron, **191**, 261, 41-E3.
- Newkirk, G. A., Jr. See MacQueen et al., The Outer Solar Corona as Observed from *Skylab*: Preliminary Results, **187**, L85, 6-D7.
- Newman, Michael J. See Clayton and Newman, *s*-Process Studies: Exact Solution to a Chain Having Two Distinct Cross-Section Values, **192**, 501, 56-F5.
- Ney, E. P. See Humphreys and Ney, Infrared Stars in Binary Systems, **190**, 339, 32-A1.
- Ney, E. P. See Humphreys and Ney, Supergiant Binary Stars, **187**, L75, 6-C12.
- Ney, E. P. See Humphreys and Ney, Visual and Infrared Observations of Late-Type Supergiants in the Southern Sky, **194**, 623, 82-G8.
- Ney, Edward P. Infrared Observations of Comet Kohoutek near Perihelion, **189**, L141, 27-E12.
- Nguyen-Q-Rieu. See Johansson et al., OH Observations near the Reflection Nebulae NGC 2068 and NGC 2071, **189**, 455, 25-E6.
- Ni, Wei-Tou. Relativistic Stellar Stability: Preferred-Frame Effects, **190**, 131, 29-C8.
- Nicholls, Ralph W. See Whiting and Nicholls, Reinvestigation of Rotational-Line Intensity Factors in Diatomic Spectra, **187**, 661, 9-C10; Suppl. 27, 1 (No. 235).
- Niell, A. E. See Kellermann et al., Further Observations of Apparent Changes in the Structure of 3C 273 and 3C 279, **189**, L19, 21-A3.
- Niell, A. E. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, **193**, 293, 67-A4.
- Niemela, Virpi, S., and Méndez, Roberto H. Emission Lines in the Spectrum of Zeta Ophiuchi, **187**, L23, 3-C5.
- Nightingale, Stephen L. See Hunter and Nightingale, The Influence of Dust upon the Dynamics and Stability of Planetary Nebulae. II., **193**, 693, 71-G9.
- Noerdlinger, Peter D. Relativistic Ejection of a Particle by Radiation Pressure. II., **192**, 529, 57-A5.
- Noerdlinger, Peter D. See Hewitt and Noerdlinger, Transfer of Resonance-Line Radiation in Differentially Expanding Atmospheres. III. Formation of P Cygni-Type Lines by a Doublet Line or Two Partially "Blended" Lines, **188**, 315, 14-A8.
- Noerdlinger, Peter D., and Rybicki, George B. Transfer of Line Radiation in Differentially Expanding Atmospheres. IV. The Two-Level Atom in Plane-parallel Geometry Solved by the Feautrier Method, **193**, 651, 71-D5.
- Noland, M., Veverka, J., and Goguen, J. New Evidence for the Variability of Titan, **194**, L157, 84-G2.
- Noonan, Thomas W. Turnover Radio Spectra of Elliptical Galaxies, **191**, 301, 43-A14.
- Norcross, D. W. See Herbst et al., Is H⁺ a Source of Diffuse Interstellar Lines?, **191**, L143, 49-C11.
- Norris, John. Advanced Evolution in Globular Clusters. II. The Ultraviolet-bright Stars in Omega Centauri, **194**, 109, 75-B4.
- Norris, John. See Auer and Norris, Neutral Helium Line Strengths. VII. The Population II B Star Barnard 29 in M13, **194**, 87, 74-G12.
- Norris, John. See McClure and Norris, Physical Characteristics of Giant Stars in the Anomalous Globular Cluster NGC 362, **193**, 139, 64-D1.
- Norris, John, and Baschek, Bodo. A Search for Neutral Iron Lines in a Centauri, **193**, 133, 64-C8.
- Noyes, R. W. See Fazio et al., A High-Resolution Map of the Orion Nebula Region at Far-Infrared Wavelengths, **192**, L23, 53-B8.
- Noyes, R. W. See Foukal et al., Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount, **193**, L143, 73-A10.
- Noyes, R. W. See Huber et al., Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from *Skylab*, **194**, L115, 81-B2.
- Noyes, R. W. See Reeves et al., Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount, **188**, L27, 12-D11.
- Oberbeck, V. R. See Aggarwal and Oberbeck, Roche Limit of a Solid Body, **191**, 577, 45-F12.
- O'Connell, R. F. Highly Excited States of Atoms in a Magnetic Field, **187**, 275, 4-E3.
- O'Connell, R. F. See Surmelian and O'Connell, Energy Spectrum of Hydrogen-like Atoms in a Strong Magnetic Field, **190**, 741, 37-D13.
- O'Connell, R. F. See Surmelian and O'Connell, Quadratic Zeeman Effect in the Hydrogen Balmer Lines from Magnetic White Dwarfs, **193**, 705, 72-A6.
- O'Connell, Robert W. Giant Dominance in E/SO Galaxies, **193**, L49, 69-B8.
- O'Connell, Robert W., Scargle, Jeffrey D., and Sargent, W. L. W. The Nature of Hoag's Object, **191**, 61, 39-E10.
- Odell, Andrew P. The Evolution of the Helium Star Sigma Orionis E, **194**, 645, 83-B6.
- Odell, Andrew P. The Structure of Alpha Virginis. II. The Apsidal Constant, **192**, 417, 55-G6.
- O'Dell, S. L. See Burbidge et al., Physics of Compact Nonthermal Sources. III. Energetic Considerations, **193**, 43, 63-D4.
- O'Dell, S. L. See Jones et al., Physics of Compact Nonthermal Sources. I. Theory of Radiation Processes, **188**, 353, 14-D2.

- O'Dell, S. L. See Jones et al., Physics of Compact Nonthermal Sources. II. Determination of Physical Parameters, **192**, 261, 54-B8.
- O'Donnell, Edward J., and Watson, William D. Upper Limits to the Flux of Cosmic Rays and X-Rays in Interstellar Clouds, **191**, 89, 40-A1.
- Oemler, Augustus, Jr. The Systematic Properties of Clusters of Galaxies. I. Photometry of 15 Clusters, **194**, 1, 74-A4.
- Oinas, Valdar. Strong-Line K Stars. I. Photometry, **192**, 233, 52-B13; Suppl. **27**, 391 (No. 250).
- Oinas, Valdar. Strong-Line K Stars. II. Chemical Abundances **192**, 233, 52-B13; Suppl. **27**, 405 (No. 250).
- Oka, T. See Doherty et al., Detection of the 10.464-GHz Transition of Interstellar Thioformaldehyde, **192**, L157, 62-A9.
- Oke, J. B. Absolute Spectral Energy Distributions for White Dwarfs, **188**, 443, 15-C13; Suppl. **27**, 21 (No. 236).
- Oke, J. B. Photoelectric Spectrophotometry of OQ 172 and OH 471, **189**, L47, 24-D6.
- Oke, J. B. See Schild et al., The Energy Distribution of the Very Red Star in NGC 6231, **188**, 71, 10-F4.
- Oke, J. B., and Gunn, J. E. The Distance of BL Lacertae, **189**, L5, 20-C4.
- Oliver, J. P. See Flesch and Oliver, Three-Color Photometry of the Flare Star EV Lacertae, **189**, L127, 27-E1.
- Olsen, E. T. See Dent et al., The Evolution of the Radio Spectrum of Cassiopeia A, **188**, L11, 12-C12.
- Olson, Roy A. See Strong et al., A Preliminary Catalog of Transient Cosmic Gamma-Ray Sources Observed by the *Vela* Satellites, **188**, L1, 12-C2.
- Omer, C. G., Jr. See Donivan et al., Radio Observations of Two Clusters of Galaxies, **187**, 11, 1-A11.
- Opher, Reuven. Acceleration of QSO Clouds by Radiation Pressure, **187**, 5, 1-A6.
- Opher, Reuven. A Theory of Galactic Nuclei and Quasi-stellar Objects, **188**, 201, 12-A13.
- Oppenheimer, M. See Dalgarno and Oppenheimer, Chemical Heating of Interstellar Clouds, **192**, 597, 59-B13.
- Oppenheimer, M. See Dalgarno et al., Hydrogen Chloride in Dense Interstellar Clouds, **192**, L37, 53-C7.
- Oppenheimer, M., and Dalgarno, A. The Chemistry of Sulfur in Interstellar Clouds, **187**, 231, 4-B4.
- Oppenheimer, M., and Dalgarno, A. The Fractional Ionization in Dense Interstellar Clouds, **192**, 29, 50-B11.
- Oren, L. See Goldsmith et al., The Spectra of S XII and S XIV in the Region 25–40 Å, **188**, 197, 12-A9.
- Osaki, Yoji. An Excitation Mechanism for Pulsations in Beta Cephei Stars, **189**, 469, 25-F10.
- Osborn, Wayne. See McClure and Osborn, Cyanogen-Band Strengths of Giant Stars in 47 Tucanae, **189**, 405, 25-A11.
- Osmer, Patrick S. See Hesser et al., High-Frequency Stellar Oscillations. X. The Rapid Blue Variable CD–42°14462, **189**, 315, 23-D14.
- Osmer, Patrick S., and Hiltner, W. A. Optical Spectra and the Mass of SMC X-1, **188**, L5, 12-C5.
- Osmer, Patrick S., and Peterson, Deane M. The Composition and Evolutionary Status of the Helium-rich Stars, **187**, 117, 2-B6.
- Osmer, Patrick S., Smith, Malcolm G., and Weedman, Daniel W. The Nuclei of Peculiar Emission-Line Galaxies, **192**, 279, 54-C12.
- Osmer, Patrick S., Smith, Malcolm G., and Weedman, Daniel W. The Southern Seyfert Galaxies NGC 1566 and NGC 3783, **189**, 187, 22-B8.
- Osterbrock, D. E. See Bohuski et al., Nebular Photometry with an Echelle Spectrometer: [O III] Lines Ratios in NGC 1976 and NGC 6853, **188**, 529, 16-F14.
- Ostriker, J. P. See Thuan and Ostriker, Gravitational Radiation from Stellar Collapse, **191**, L105, 49-A6.
- Ostriker, J. P., Peebles, P. J. E., and Yahil, A. The Size and Mass of Galaxies, and the Mass of the Universe, **193**, L1, 66-A2.
- Ostriker, J. P., Richstone, D. O., and Thuan, T. X. On the Numbers, Birthrates, and Final States of Moderate- and High-Mass Stars, **188**, L87, 18-C14.
- Ostriker, Jeremiah P. See Bodenheimer and Ostriker, Do Pulsars Make Supernovae? II. Calculations of Light Curves for Type II Events, **191**, 465, 44-F6.
- Ostriker, Jeremiah P. See Davidsen and Ostriker, The Nature of Cygnus X-3: A Prototype for Old-Population Binary X-Ray Sources, **189**, 331, 23-F1.
- Ostriker, Jeremiah P. See Herbst et al., The 71-Second Variation of DQ Herculis, **193**, 679, 71-F9.
- Owen, Frazer N. The Correlation of Radio Emission and Optical Type with X-Ray Emission from Clusters of Galaxies, **189**, L55, 24-D12.
- Owen, Tobias. See Lutz and Owen, The Search for HD in the Spectrum of Uranus: An Upper Limit to [D/H], **190**, 731, 37-D3.
- Owen, Tobias, Lutz, Barry L., Porco, Carolyn C., and Woodward, Jerry H. On the Identification of the 6420 Å Absorption Feature in the Spectra of Uranus and Neptune, **189**, 379, 24-B10.
- Owens, A. J. The Effects of Nonlinear Terms in Cosmic-Ray Diffusion Theory, **191**, 235, 41-C5.
- Owens, A. J. See Forman et al., Cosmic-Ray Streaming Perpendicular to the Mean Magnetic Field, **192**, 535, 57-A10.
- Pacholczyk, A. G., and Swihart, T. L. Polarization of Radio Sources. V. Absorption Effects on Circular Repolarization in Compact Sources, **192**, 591, 59-B8.
- Pacini, F., and Salvati, M. Early Evolution of Radio Outbursts and a Possible Transient Emission of High-Energy Photons, **188**, L55, 15-E9.
- Packman, D. See Becklin et al., Infrared, Radio, and X-Ray Observations of Cygnus X-3, **192**, L119, 61-E11.
- Paczynski, B. Helium-Shell Flashes in Population I Stars, **192**, 483, 56-E1.
- Paczynski, B. See Bahcall et al., Multiple Star Systems and X-Ray Sources, **189**, L17, 21-A1.
- Page, Don N., and Thorne, Kip S. Disk-Accretion onto a Black Hole. I. Time-averaged Structure of Accretion Disk, **191**, 499, 45-A9.
- Palmer, Patrick. See Morris et al., Millimeter-Wavelength Molecular Lines and Far-Infrared Sources, **191**, 349, 43-E4.
- Palmer, Patrick. See Morris et al., The New Molecular Cloud in Orion, **192**, L27, 53-B11.
- Palmer, Patrick. See Zuckerman et al., $^{12}\text{C}/^{13}\text{C}$ Abundance Ratios from Observations of Interstellar $\text{H}_2^{13}\text{C}^{16}\text{O}$, **189**, 217, 22-D7.
- Palumbo, G. G. C., Pizzichini, G., and Vespignani, G. R. Observation of a Celestial Hard X-Ray Burst in Coincidence with a Gamma-Ray Burst, **189**, L9, 20-G8.
- Panagia, Nino. Infrared Emission from H II Regions, **192**, 221, 52-B1.
- Panek, Robert J. See Savage and Panek, Ultraviolet Photometry from the Orbiting Astronomical Observatory. XVI. The Stellar Lyman-Alpha Absorption Line, **191**, 659, 47-E5.
- Papadopoulos, Konstantinos, Goldstein, Melvyn L., and Smith, Robert A. Stabilization of Electron Streams in Type III Solar Radio Bursts, **190**, 175, 29-F7.
- Pardo, R. C., Couch, R. G., and Arnett, W. D. A Study of Nucleosynthesis during Explosive Carbon Burning, **191**, 711, 48-B1.
- Paresce, Francesco, Bowyer, Stuart, and Kumar, Shailendra. Further Evidence for an Interstellar Source of Nighttime He I 584 Å Radiation, **188**, L71, 15-F8.
- Paresce, Francesco, Bowyer, Stuart, and Kumar, Shailendra. Observations of He I 584 Å Nighttime Radiation: Evidence for an Interstellar Source of Neutral Helium, **187**, 633, 9-A12.
- Paresce, Francesco. See Crudde et al., On the Opacity of the Interstellar Medium to Ultrasoft X-Rays and Extreme-Ultraviolet Radiation, **187**, 497, 7-F1.
- Parijskij, Y. N. New Limit on Small-Scale Irregularities of "Blackbody" Radiation (Erratum), **188**, L113, 18-E8.
- Parish, Jeffrey L. Pulsar Near Fields, **193**, 225, 65-B13.
- Parker, E. N. Comment on "Galactic Magnetic Fields: Cellular or Filamentary Structure?", **187**, 191, 2-G4.

- Parker, E. N. The Dynamical Properties of Twisted Ropes of Magnetic Field and the Vigor of New Active Regions on the Sun, **191**, 245, 41-D1.
- Parker, E. N. Hydraulic Concentration of Magnetic Fields in the Solar Photosphere. I. Turbulent Pumping, **189**, 563, 26-F1.
- Parker, E. N. Hydraulic Concentration of Magnetic Fields in the Solar Photosphere. II. Bernoulli Effect, **190**, 429, 32-G5.
- Parker, R. H. See Metzger et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. I. Temporal Variability and Energy Spectrum, **194**, L19, 76-D9.
- Parkinson, J. H. See Fabian et al., *Copernicus* X-Ray Observations of NGC 1275 and the Core of the Perseus Cluster, **189**, L59, 24-E1.
- Parkinson, T. See Tracton et al., The Spatial Extent of Sodium Emission around Io, **190**, L85, 34-A8.
- Parks, Allen D. See Sampson and Parks, Electron-Impact Excitation Cross-Sections for Complex Ions. II. Application to the Isoelectronic Series of Helium and Other Light Elements, **193**, 289, 65-G5; Suppl. **28**, 323 (No. 263).
- Parsignault, D. R. See Brinkman et al., Correlation Analysis of X-Ray Emission from Cygnus X-1, **188**, 604, 17-E3.
- Partridge, R. B. A Search for Primeval Galaxies at High Redshifts, **192**, 241, 54-A4.
- Pasachoff, Jay M., and Cesarsky, Diego A. Further Observations at the Interstellar Deuterium Frequency, **193**, 65, 63-E13.
- Patterson, T. A. See Herbst et al., Is H⁻ a Source of Diffuse Interstellar Lines?, **191**, L143, 49-C11.
- Payne, R. R. See Rankin et al., The Crab Nebula Pulsar: Radiofrequency Spectral Variability, **193**, L71, 69-D2.
- Payzant, J. D. See Schiff et al., Laboratory Measurements of Some Ion-Molecule Reactions Related to the Formation of HCN in Dense Interstellar Clouds, **191**, L49, 42-D7.
- Peacock, A. See Fabian et al., *Copernicus* X-Ray Observations of NGC 1275 and the Core of the Perseus Cluster, **189**, L59, 24-E1.
- Pearson, Peter K., and Schaefer, Henry F., III. Some Properties of H₂CN⁺: A Potentially Important Interstellar Species, **192**, 33, 50-C1.
- Peebles, P. J. E. The Gravitational-Instability Picture and the Nature of the Distribution of Galaxies, **189**, L51, 24-D9.
- Peebles, P. J. E. Statistical Analysis of Catalogs of Extragalactic Objects. IV. Cross-Correlation of the Abell and Shane-Wirtanen Catalogs, **192**, 239, 52-C2; Suppl. **28**, 37 (No. 253).
- Peebles, P. J. E. See Ostriker et al., The Size and Mass of Galaxies, and the Mass of the Universe, **193**, L1, 66-A2.
- Peebles, P. J. E., and Hauser, M. G. Statistical Analysis of Catalogs of Extragalactic Objects. III. The Shane-Wirtanen and Zwicky Catalogs, **192**, 239, 52-C2; Suppl. **28**, 19 (No. 253).
- Peimbert, M. See Torres-Peimbert et al., Ionization of the Low-Density Interstellar Medium, **191**, 401, 44-A12.
- Peimbert, Manuel, and Torres-Peimbert, Silvia. Chemical Composition of H II Regions in the Large Magellanic Cloud and Its Cosmological Implications, **193**, 327, 67-C8.
- Pel, J. See Mook et al., Color Variations of Scorpius X-1, **191**, 493, 45-A2.
- Pence, W. See de Vaucouleurs et al., Further Evidence for an Explosive Event in the Peculiar Galaxy NGC 1569, **194**, L119, 84-D2.
- Penfield, H. See Black et al., Radiofrequency Emission from CH in Comet Kohoutek (1973f), **191**, L45, 42-D3.
- Penfield, Hays. See Lada et al., Discovery and CO Observations of a New Molecular Source near M17, **189**, L35, 21-B4.
- Penston, M. V. See Gatley et al., A New Infrared Complex and Molecular Cloud in Orion, **191**, L121, 49-B6.
- Penzias, A. A. See Lizst et al., CO and CS in the Orion Nebula, **190**, 557, 35-E8.
- Perry, M. E. See Wickramasinghe et al., 2U 0900-40: A Black Hole?, **188**, 167, 11-F4.
- Persson, S. E. See Becklin et al., The H II Region G333.6-0.2, a Very Powerful 1-20 Micron Source (Erratum), **193**, L153, 73-B7.
- Persson, S. E. See Becklin et al., Infrared Emission from the Souther H II Region H2-3, **187**, 487, 7-E6.
- Persson, S. Eric. See Dickinson et al., CO Emission Associated with Sharpless H II Regions, **192**, 347, 55-B1.
- Persson, S. Eric. See Frogel and Persson, Compact Infrared Sources Associated with Southern H II Regions, **192**, 351, 55-B4.
- Persson, S. Eric. See Schild et al., The Nature of Infrared Excesses in Extreme Be Stars, **190**, 73, 28-F7.
- Persson, S. Eric, and Frogel, Jay A. Spectrophotometric Observations of the Compact H II Region K3-50 and of NGC 6857, **188**, 523, 16-F9.
- Peters, William L. See Loren et al., Collapsing Molecular Clouds?, **194**, L103, 81-A1.
- Peterson, B. A. See Bessell et al., 2U 1700-37: Another Black Hole?, **187**, 355, 5-C10.
- Peterson, B. A. See Disney et al., The Redshift and Composite Nature of AP Librae (PKS 1514-24), **194**, L79, 80-F4.
- Peterson, B. A. See Vidal et al., Photoelectric and Spectroscopic Observations of WRA 795, **188**, 163, 11-E13.
- Peterson, B. A. See Vidal et al., Spectroscopic Studies of a Suggested Optical Candidate for Centaurus X-3, **191**, L23, 42-B11.
- Peterson, B. A. See Wickramasinghe et al., 2U 0900-40: A Black Hole?, **188**, 167, 11-F4.
- Peterson, Charles J. Distribution of Orbital Eccentricities of the Globular Clusters, **190**, L17, 30-E7.
- Peterson, Deane M. See Osmer and Peterson, The Composition and Evolutionary Status of the Helium-rich Stars, **187**, 117, 2-B6.
- Peterson, L. E. See Baity et al., Extended Observations of >7-keV X-Rays from Centaurus X-3 by the OSO-7 Satellite, **187**, 341, 5-B9.
- Peterson, L. E. See Metzger et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. I. Temporal Variability and Energy Spectrum, **194**, L19, 76-D9.
- Peterson, L. E. See Ulmer et al., 4.8-Second Pulsed X-Rays from Centaurus X-3 at Energy Greater than 7 keV, **191**, 593, 46-A1.
- Peterson, L. E. See Ulmer et al., Long-Term Observations of Cygnus X-2 from OSO-7, **189**, 339, 23-F9.
- Peterson, L. E. See Ulmer et al., Observations of the 4.8-Hour Variations of Cygnus X-3 above 7 keV from the OSO-7, **192**, 691, 60-B4.
- Peterson, L. E. See Ulmer et al., Upper Limit to the X-Ray Flux from Supernova in NGC 5253 above 7 keV from the OSO-7, **193**, 535, 70-C6.
- Peterson, Laurence E. See Schwartz and Peterson, The Spectrum of Diffuse Cosmic X-Rays Observed by OSO-3 between 7 and 100 keV, **190**, 297, 31-E3.
- Peterson, R. J. See Roughton et al., Stellar Reaction Rates for Proton Capture on ²⁹Si, ⁵⁰Cr, ⁵⁴Fe, ⁵⁸Ni, ⁶⁰Ni, and ⁶¹Ni, **193**, 187, 64-G7.
- Peterson, R. J. See Roughton et al., Thick-Target Measurement of the (p, γ) Stellar Reaction Rates of the Nuclides ¹²C, ²⁹Si, ⁴⁶Ti, ⁴⁷Ti, and ⁵⁶Fe, **188**, 595, 17-D10.
- Petrov, Larry D., and Hiltner, W. A. Optical Observations of HD 77581 and a Model for the System HD 77581-2U 0900-40, **190**, 661, 36-F7.
- Petrosian, Vahé. The Hubble Relation for Nonstandard Candles and the Origin of the Redshift of Quasars, **188**, 443, 16-A3.
- Petrosian, Vahé. See Adams and Petrosian, Effect of Inelastic Electron-Atom Collisions on the Balmer Decrement, **192**, 199, 51-G8.
- Petrosian, Vahé. See McKee and Petrosian, Are Quasars Dusty?, **189**, 17, 19-B7.
- Peytremann, Eric, and Davis, Robert J. Ultraviolet Television Data from the Orbiting Astronomical Observatory. II. Stellar Ultraviolet Colors and Interstellar Extinction, **192**, 815, 61-C12; Suppl. **28**, 211 (No. 260).
- Philip, A. G. Davis. Four-Color Observations of Early-Type Stars. IV. South Galactic Pole, **190**, 573, 35-F10.
- Phillips, John G. The Fundamental Rotation-Vibration Band of TiO, **191**, 597, 46-A4; Suppl. **27**, 319 (No. 247).
- Phillips, T. G., Jefferts, K. B., and Wannier, P. G. A New DCN

- Line: DCN(HCN) Excitation, **192**, L153, 62-A5.
- Phillips, T. G., Jefferts, K. B., Wannier, P. G., and Ade, P. A. R. Large-Scale Wave Structure in the Orion Molecular Cloud, **191**, L31, 42-C5.
- Pigatto, L. See Sprott et al., Limit on X-Ray Emission from a Supernova during Maximum Light, **191**, 739, 48-C13.
- Pike, C. D. See Walker et al., Direct Electronographic Observations of Luminous Connections between Galaxies with Discordant Redshifts, **194**, L125, 84-D8.
- Pilachowski, Catherine A. See Bonsack and Pilachowski, The Extraordinarily Slow Magnetic Variation of Gamma Equulei, **190**, 327, 31-G4.
- Pilachowski, Catherine A. See Bonsack et al., The Variations of the Magnetic Ap Star 49 Camelopardalis, **187**, 265, 4-D7.
- Pilachowski, Catherine A. See Wolff et al., BD+37°1977: A Very Hot Subdwarf, **194**, L83, 80-F9.
- Pilavaki, Andrea. See FitzGerald and Pilavaki, V1016 Cygni: Spectral Observations 1969-1973, **192**, 575, 57-D7; Suppl. **28**, 147 (No. 258).
- Pilipp, Werner G. On the Electrodynamic Equilibrium of a Space Charge Region around a Rotating Neutron Star with an Aligned Magnetic Field, **190**, 391, 32-D11.
- Pipher, Judith L., Grasdalen, G. L., and Soifer, Baruch T. Infrared Observations of the Radio Source G30.8-0.0 in the W43 Complex, **193**, 283, 65-F13.
- Pizzichini, G. See Palumbo et al., Observation of a Celestial Hard X-Ray Burst in Coincidence with a Gamma-Ray Burst, **189**, L9, 20-G8.
- Poland, A. I. See Heasley et al., Theoretical Helium I Emission-Line Intensities for Quiescent Prominences, **192**, 181, 51-F4.
- Poland, A. I. See MacQueen et al., The Outer Solar Corona as Observed from *Skylab*: Preliminary Results, **187**, L85, 6-D7.
- Pomphrey, R. B. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, **191**, 51, 39-E1.
- Pomraning, G. C. The Stokes Parameters for Light Arising from Induced Processes, **191**, 183, 40-G1.
- Poppen, Richard F. See Fink et al., A New Upper Limit for an Atmosphere of CO₂, CO on Mercury, **187**, 407, 5-G2.
- Popper, Daniel M. Rediscussion of Eclipsing Binaries. X. The B Stars AG Persei and CW Cassiopeiae, **188**, 559, 17-B3.
- Porco, Carolyn C. See Owen et al., On the Identification of the 6420 Å Absorption Feature in the Spectra of Uranus and Neptune, **189**, 379, 24-B19.
- Potter, A. E. See Barnes et al., Infrared Spectra of γ² Velorum and ξ Puppis, **187**, 73, 1-F1.
- Potter, A. E. See Morgan et al., Complex Infrared Emission Features in the Spectrum of Beta Lyrae, **190**, 349, 32-A12.
- Pounds, K. A. See Fabian et al., *Copernicus* X-Ray Observations of NGC 1275 and the Core of the Perseus Cluster, **189**, L59, 24-E1.
- Praderie, Françoise. See Boesgaard et al., The Abundance of Boron and Beryllium in Alpha Lyrae, **194**, L143, 84-F1.
- Prather, M. J. Solution of the Inhomogeneous Rayleigh Scattering Atmosphere, **192**, 787, 61-A13.
- Prather, M. J., and Demarque, P. Convective Overshoot Mixing in Old Open Clusters, **193**, 109, 64-A12.
- Prather, Michael. See Wallace et al., The Thermal Structure of the Atmosphere of Jupiter, **193**, 481, 68-G9.
- Prendergast, K. H. See Sanders and Prendergast, The Possible Relation of the 3-Kiloparsec Arm to Explosions in the Galactic Nucleus, **188**, 489, 16-D4.
- Prendergast, K. H., and Taam, R. E. Numerical Simulation of the Gas Flow in Close Binary Systems, **189**, 125, 20-C3.
- Press, William H. See Teukolsky and Press, Perturbations of a Rotating Black Hole. III. Interaction of the Hole with Gravitational and Electromagnetic Radiation, **193**, 443, 68-D12.
- Press, William H., and Schechter, Paul. Formation of Galaxies and Clusters of Galaxies by Self-similar Gravitational Condensation, **187**, 425, 7-A3.
- Press, William H., and Schechter, Paul. Remark on the Statistical Significance of Flares in Poisson Count Data, **193**, 437, 68-D6.
- Price, P. B. See Chan and Price, Anomalies in the Composition of Interplanetary Heavy Ions with $0.01 < E < 40$ MeV per amu, **190**, L39, 30-G3.
- Prinz, D. K. The Spatial Distribution of Lyman-α on the Sun, **187**, 369, 5-D9.
- Ptak, Roger. See Stoner et al., The Interpretation of Broad Emission Lines in High-Redshift QSOs, **191**, 291, 43-A4.
- Puget, J. L. See Stecker et al., Possible Evidence for Structured Acceleration of Cosmic Rays on a Galactic Scale from Recent γ-Ray Observations, **188**, L59, 15-E13.
- Puget, J. L., and Stecker, F. W. The Distribution of Cosmic Rays in the Galaxy and their Dynamics as Deduced from Recent γ-Ray Observations, **191**, 323, 43-C7.
- Putron, C. R. See Marsh et al., A Model for the Radio Bursts of Cygnus X-3, **192**, 697, 60-B9.
- Rakavy, G. See Barkat et al., Stars in the Mass Range $7 \leq M/M_{\odot} \leq 10$ as Candidates for Pulsar Progenitors, **193**, L21, 66-B6.
- Ramanathan, V., and Cess, R. D. Radiative Transfer within the Mesospheres of Venus and Mars, **188**, 407, 15-A5.
- Ramaty, R. See Fisk et al., An Interpretation of the Observed Oxygen and Nitrogen Enhancements in Low-Energy Cosmic Rays, **190**, L35, 30-F14.
- Ramaty, R. See Kozlovsky and Ramaty, 478-keV and 431-keV Line Emissions from Alpha-Alpha Reactions, **191**, L43, 42-D1.
- Ramaty, R., Cheng, C. C., and Tsuruta, S. Scorpius X-1: Origin of the Radio and Hard X-Ray Emissions, **187**, 61, 1-E3.
- Ramaty, R., and Kozlovsky, B. Deuterium, Tritium, and Helium-3 Production in Solar Flares, **193**, 729, 72-C1.
- Ramsey, L. W. See Johnson et al., Formation of the Luminosity-sensitive O I Multiplet at 7774 Å, **187**, 147, 2-D7.
- Rank, D. M., Geballe, T. R., and Wollman, E. R. Detection of ¹⁷O in IRC+10216, **187**, L111, 9-E3.
- Rankin, John M. See Spangler et al., Four-Stokes-Parameter Radiofrequency Polarimetry of a Flare from AD Leonis, **194**, L43, 76-F2.
- Rankin, John M. See Spangler et al., Short-Duration Radio Flares of UV Ceti Stars, **190**, L129, 37-G9.
- Rankin, John M., Campbell, D. B., and Backer, D. C. Individual Pulse Polarization Properties of Three Pulsars, **188**, 609, 17-E10.
- Rankin, John M., Payne, R. R., and Campbell, D. B. The Crab Nebula Pulsar: Radiofrequency Spectral Variability, **193**, L71, 69-D2.
- Rapley, C. G. See Culhane et al., Detection of Soft X-Ray Emission from PSR 0833-45, **190**, L9, 30-D13.
- Rapley, C. G., and Tuohy, I. R. X-Ray Observations of the Large Magellanic Cloud by the *Copernicus* Satellite, **191**, L113, 49-A13.
- Rappaport, S. See Spada et al., Limits on Rapid X-Ray Pulsing in X-Ray Binaries, **190**, L113, 37-F10.
- Rappaport, S., Cash, W., Doxsey, R., McClintock, J., and Moore, G. Possible Detection of Very Soft X-Rays from SS Cygni, **187**, L5, 3-B5.
- Rappaport, S., Doxsey, R., Solinger, A., and Borken, R. X-Ray Structure of the Cygnus Loop, **194**, 329, 78-C3.
- Rather, J. D. G. See Ade et al., Limits to Solar Limb Darkening at a Wavelength of 1.4 Millimeters Derived from Antenna-Beam Parameters, **187**, 389, 5-E13.
- Rather, John D. G. See Ade et al., 1-Millimeter Observations of the Galactic H II Regions M42 and DR 21, **189**, L23, 21-A7.
- Reagan, J. B. See Imhof et al., Spectra Measurements of a Cosmic Gamma-Ray Burst with Fast Time Resolution, **191**, L7, 42-A7.
- Redman, R. O. See Hutchings et al., Evidence for the Existence of a Massive Companion to X Persei (=2U 0352+30?), **191**, L101, 49-A2.
- Reed, R. A. See Houck et al., 20 to 40 Micron Spectroscopy of the Orion Nebula, **193**, L139, 73-A7.
- Reeves, E. M. See Foukal et al., Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount, **193**, L143, 73-A10.

- Reeves, E. M. See Huber et al., Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from *Skylab*, 194, L115, 81-B2.
- Reeves, E. M., Foukal, P. V., Huber, M. C. E., Noyes, R. W., Schmahl, E. J., Timothy, J. G., Vernazza, J. E., and Withbroe, G. L. Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount, 188, L27, 12-D11.
- Reiss, Y. See Barkat et al., Stars in the Mass Range $7 \leq M/M_{\odot} \leq 10$ as Candidates for Pulsar Progenitors, 193, L21, 66-B6.
- Renshaw, A. See Fleischer et al., Composition of Heavy Cosmic Rays from 25 to 180 MeV per Atomic Mass Unit, 193, 575, 70-F2.
- Reynolds, R. J., Roesler, F. L., and Scherb, F. The Intensity Distribution of Diffuse Galactic H α Emission, 192, L53, 57-E2.
- Rich, A. See Brown et al., Further Observations for Circularly Polarized Radiation from White Dwarfs and X-Ray Sources, 191, L111, 49-A11.
- Rich, A., and Williams, W. L. Observations for Broad-Band Circular Polarization in White Dwarfs and Nuclei of Planetary Nebulae, 190, 117, 29-B8.
- Richards, W. G. See Hammersley and Richards, A-Type Doubling in the CD Molecule, 194, L61, 76-G4.
- Richer, Harvey B., and Ulrych, Tad J. High-Frequency Optical Variables. II. Luminosity-Variable White Dwarfs and Maximum Entropy Spectral Analysis, 192, 719, 60-D2.
- Richstone, D. O. See Ostriker et al., On the Numbers, Birthrates, and Final States of Moderate- and High-Mass Stars, 188, L87, 18-C14.
- Richstone, Douglas O. The Occurrence of a Nonspherical Thermal Instability in Red Giant Stars, 188, 327, 14-B6.
- Rickard, J. J. Spectroscopic Observations of the Optical Companion to Centaurus X-3, 189, L113, 27-D1.
- Ricort, Gilbert. See Fossat et al., Evidence for Large-Scale Oscillations of the Solar Photosphere, 193, L97, 69-E13.
- Ridgway, S. T. Jupiter: Identification of Ethane and Acetylene, 187, L41, 3-D9; Erratum, 192, L51, 53-D8.
- Ridgway, Stephen T. The Carbon Monoxide Band Strength and $^{12}\text{C}/^{13}\text{C}$ Ratio in K Giants, 190, 591, 35-G12.
- Riegel, Kurt W. See Crutcher and Riegel, Optical Interstellar Line Studies of a Nearby Cold Cloud, 188, 481, 16-C10.
- Rieke, G. H. The Spectrum of VI Cygni No. 12 near 10 Microns, 193, L81, 69-D12.
- Rieke, G. H. See Kinman et al., Optical and Infrared Observations of the Jet of M87, 194, L1, 76-C2.
- Rieke, G. H. See Low and Rieke, Infrared Photometry of Titan, 190, L143, 38-A7.
- Rieke, G. H., and Kinman, T. D. Correlated and Infrared Behavior of OI 287 and Similar Radio Sources, 192, L115, 61-E8.
- Rieke, G. H., and Low, F. J. Infrared Measurements of Uranus and Neptune, 193, L147, 73-B1.
- Ries, L. M. See Lambert et al., The Oxygen Abundance in the Metal-deficient Star HD 122563, 188, 97, 11-A9.
- Righini, G. See Gezari et al., 350-Micron Mapping of the Orion Molecular Cloud, 191, L33, 42-C7.
- Ringuelet, Adela E., and Machado, Marcos E. Short-Period Radial-Velocity Variations in π Aquarii, 189, 285, 23-B12.
- Rios, M. See Howard et al., Measurement and Theoretical Analysis of Some Reaction Rates of Interest in Silicon Burning, 188, 131, 11-C13.
- Roark, B. See Roark et al., Monte Carlo Model of Reflection Nebulae: Intensity Gradients, 190, 67, 28-F1.
- Roark, T., Roark, B., and Collins, G. W., II. Monte Carlo Model of Reflection Nebulae: Intensity Gradients, 190, 67, 28-F1.
- Robbins, R. R. See Bernat and Robbins, On the Use of Mean Escape Probabilities to Solve Transfer Problems in Nebulae, 189, 459, 25-E11.
- Robbins, R. R., and Bernat, A. P. Optical Thickness in the He I Singlet Spectrum of Nebulae, 188, 309, 14-A2.
- Roberts, Morton S. See De Young and Roberts, The Stability of Galaxy Clusters: Neutral Hydrogen Observations, 189, 1, 19-A5.
- Roberts, Wm. James. A Slaved Disk Model for Hercules X-1, 187, 575, 8-D11.
- Robertson, J. W. Core-Helium-Burning Stars in Young Clusters in the Large Magellanic Cloud, 191, 67, 39-F6.
- Robinson, E. L. See Nather and Robinson, Coherent Oscillations in UX Ursae Majoris, 190, 637, 36-D7.
- Robinson, Edward L. The Mass of the Dwarf Nova EM Cygni, 193, 191, 64-G10.
- Robinson, L. B. See Baldwin et al., An Analysis of the Spectrum of the Large-Redshift Quasi-stellar Object OQ 172, 193, 513, 70-A11.
- Roddier, François. See Fossat et al., Evidence for Large-Scale Oscillations of the Solar Photosphere, 193, L97, 69-E13.
- Rodgers, A. W. The Composition of RR Lyrae Stars, 191, 433, 44-D4.
- Rodgers, A. W. See Disney et al., The Redshift and Composite Nature of AP Librae (PKS 1514-24), 194, L79, 80-F4.
- Rodney, W. S. See Rolfs and Rodney, Experimental Evidence for CNO Tri-cycling, 194, L63, 80-E2.
- Roeder, R. C. See Dyer and Roeder, Observations in Locally Inhomogeneous Cosmological Models, 189, 167, 22-A4.
- Roesler, F. L. See Reynolds et al., The Intensity Distribution of Diffuse Galactic H α Emission, 192, L53, 57-E2.
- Rogers, A. E. E., Hinteregger, H. F., Whitney, A. R., Counselman, C. C., Shapiro, I. I., Wittels, J. J., Klemperer, W. K., Warnock, W. W., Clark, T. A., Hutton, L. K., Marandino, G. E., Ronnang, B. O., Rydbeck, O. E. H., and Niell, A. E. The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, 193, 293, 67-A4.
- Rogstad, D. H., Lockhart, I. A., and Wright, M. C. H. Aperture-Synthesis Observations of H I in the Galaxy M83, 193, 309, 67-B7.
- Rogstad, David H. See Madore et al., Gas Density and the Rate of Star Formation in M33, 191, 317, 43-C2.
- Rolfs, C., and Rodney, W. S. Experimental Evidence for CNO Tri-cycling, 194, L63, 80-E2.
- Romanishin, W. See Harris and Romanishin, Inverse Compton Radiation and the Magnetic Field in Clusters of Galaxies, 188, 209, 13-A3.
- Ronnang, B. O. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, 193, 293, 67-A4.
- Rood, Herbert J. Concerning Two Forces Hypothesized to Resolve the Mass Discrepancy of Galaxy Clusters, 193, 15, 63-B5.
- Rood, Herbert J. Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. II., 188, 451, 16-A10.
- Rood, Herbert J. Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. III. The Page and Jenner Samples of Close Double Galaxies, 193, 1, 63-A4.
- Rood, Herbert J. Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. V. Nine Samples, 194, 27, 74-C8.
- Rood, Herbert J. See Chincarini and Rood, Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. IV. Double Compact Galaxies, 194, 21, 74-C2.
- Rose, W. K. See Levy and Rose, Production of Magnetic Fields in the Interiors of Stars and Several Effects on Stellar Evolution, 193, 419, 68-C3.
- Rose, William K. See Hardee and Rose, Relativistic-Particle Beam Instabilities and X-Ray Pulse Production by the Crab Pulsar, 194, L35, 76-E9.
- Rose, William K., Krall, Nicholas A., and Liewer, Paulett C. Penetration of a Low-Frequency Magnetic Wave into a Nebula Plasma, 191, 201, 41-A3.
- Rose, William K., and Tinsley, Beatrice M. Late Stages of Stellar Evolution in the Light of Elliptical Galaxies, 190, 243, 31-A4.
- Rosen, Richard A. A Nonlinear Model for the Intensity, Line Width, and Coherence of Astrophysical Masers, 190, L73, 33-G11.
- Rosenthal, Jeffrey D. A Note on the Use of the Strength of the Si II Doublet $\lambda\lambda 6347, 6371$ as a Luminosity Indicator in B9-A2

- Supergiants, 187, 261, 4-D4.
- Rosenthal, Jeffrey D. See Schmidt et al., A Comparison of Variable and Nonvariable Stars in the Cepheid Strip, 189, 293, 23-C5.
- Rosino, L. See Sprott et al., Limit on X-Ray Emission from a Supernova during Maximum Light, 191, 739, 48-C13.
- Koss, C. L. See MacQueen et al., The Outer Solar Corona as Observed from *Skylab*: Preliminary Results, 187, L85, 6-D7.
- Rothschild, R. E. See Holt et al., A New Measurement of the Hercules X-1 X-Ray Pulse Profile, 190, L109, 37-F7.
- Rothschild, R. E., Boldt, E. A., Holt, S. S., and Serlemitsos, P. J. Millisecond Temporal Structure in Cygnus X-1, 189, L13, 20-G11.
- Roughton, N. A., Fritts, M. J., Peterson, R. J., Zaidins, C. S., and Hansen, C. J. Stellar Reaction Rates for Proton Capture on ^{28}Si , ^{50}Cr , ^{54}Fe , ^{58}Ni , ^{60}Ni , and ^{61}Ni , 193, 187, 64-G7.
- Roughton, N. A., Fritts, M. J., Peterson, R. J., Zaidins, C. S., and Hansen, C. J. Thick-Target Measurement of the (p, γ) Stellar Reaction Rates of the Nuclides ^{12}C , ^{28}Si , ^{46}Ti , ^{47}Ti , and ^{56}Fe , 188, 595, 17-D10.
- Roxburgh, Ian W. On the Nature of the Asymptotically Adiabatic Solution of the Two-Fluid Solar Wind, 191, 557, 45-E8.
- Rubin, Vera C. Two Chains of Interesting Southern Galaxies: NGC 7172-7173-7174-7176 and NGC 7201-7203-7204, 191, 645, 47-D8.
- Ruderman, M. See Lodenquai et al., Photon Opacity in Surfaces of Magnetic Neutron Stars, 190, 141, 29-D3.
- Ruderman, M. A., and Sutherland, P. G. Rotating Superfluid in Neutron Stars, 190, 137, 29-C14.
- Ruderman, Malvin A. See Chen et al., Structure of Solid Iron in Superstrong Neutron-Star Magnetic Fields, 191, 473, 44-F13.
- Rugge, H. R. See Walker et al., Relative Coronal Abundances Derived from X-Ray Observations. I. Sodium, Magnesium, Aluminum, Silicon, Sulfur, and Argon, 188, 423, 15-B9.
- Rugge, H. R. See Walker et al., Relative Coronal Abundances Derived from X-Ray Observations. II. Nitrogen, Oxygen, Neon, Magnesium, and Iron, 192, 169, 51-E5.
- Rugge, H. R. See Walker et al., Relative Coronal Abundances Derived from X-Ray Observations. III. The Effect of Cascades on the Relative Intensity of Fe XVII Line Fluxes, and a Revised Iron Abundance, 194, 471, 79-F5.
- Ryan, James A. See Lutz and Ryan, Silicon Carbide: Its Ground State and Predicted Spectrum, 194, 753, 84-B8.
- Rybicki, George B. See Noerdlinger and Rybicki, Transfer of Line Radiation in Differentially Expanding Atmospheres. IV. The Two-Level Atom in Plane-parallel Geometry Solved by the Feautrier Method, 193, 651, 71-D5.
- Rybeck, O. E. H. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, 193, 293, 67-A4.
- Rydgren, A. Eric, and Smith, Myron A. An Empirical Line Blanking Study of Am Stars, 193, 125, 64-C1.
- Rydgren, Anthony E. See Grandi et al., The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis, 190, 365, 32-C1.
- Saab, Allan F. On Gaseous Flows in Disk Galaxies, 189, 33, 19-C8.
- Saarlos, John A. See Mast et al., Search for Gravitational Radiation from Pulsars, 187, L49, 6-B2.
- Saba, J. L. R. See Holt et al., A New Measurement of the Hercules X-1 X-Ray Pulse Profile, 190, L109, 37-F7.
- Sackmann, I.-Juliana, Smith, Richard L., and Despain, Keith H. Carbon and Eruptive Stars: Surface Enrichment of Lithium Carbon, Nitrogen, and ^{13}C by Deep Mixing, 187, 555, 8-C5.
- Sagan, Carl. See Elliot et al., The Occultation of Beta Scorpii by Jupiter. II. The Hydrogen-Helium Abundance in the Jovian Atmosphere, 190, 719, 37-C6.
- Sagan, Carl. See Neverka et al., On the Upper Atmosphere of Neptune, 189, 569, 26-F7.
- Saint Clair, J. M. See Haque et al., Microwave Spectrum of ^{13}C Methanol, 187, L15, 3-B13.
- Salpeter, E. E. Formation and Flow of Dust-Grains in Cool Stellar Atmospheres, 193, 585, 70-F11.
- Salpeter, E. E. Nucleation and Growth of Dust Grains, 193, 579, 70-F5.
- Salpeter, E. E. See Katz and Salpeter, X-Ray Emission from Vibrating White Dwarfs, 193, 429, 68-C12.
- Salpeter, E. E. See Katz et al., Models for Nuclei of Planetary Nebulae and Ultraviolet Stars, 190, 359, 32-B8.
- Salpeter, E. E. See Mansfield and Salpeter, Numerical Models for Supernova Remnants, 190, 305, 31-E10.
- Salvati, M. See Pacini and Salvati, Early Evolution of Radio Outbursts and a Possible Transient Emission of High-Energy Photons, 188, L55, 15-E9.
- Sammuli, A. See Ulmer et al., Long-Term Observations of Cygnus X-2 from OSO-7, 189, 339, 23-F9.
- Sampson, Douglas H. Electron-Impact Excitation Cross-Sections for Complex Ions. I. Theory for Ions with One and Two Valence Electrons, 193, 289, 65-G5; Suppl. 28, 309 (No. 263).
- Sampson, Douglas H., and Parks, Allen D. Electron-Impact Excitation Cross-Sections for Complex Ions. II. Application to the Isoelectronic Series of Helium and Other Light Elements, 193, 289, 65-G5; Suppl. 28, 323 (No. 263).
- Sandage, Allan. See Kristian et al., On the Systematic Optical Identification of the Remaining 3C Radio Sources. I. A Search in 47 Fields, 191, 43, 39-C12.
- Sandage, Allan, and Johnson, Harold L. A Preliminary Photoelectric Sequence in the Galaxy M33 of the Local Group, 191, 63, 39-E13.
- Sandage, Allan, and Tammann, G. A. Steps toward the Hubble Constant. I. Calibration of the Linear Sizes of Extragalactic H II Regions, 190, 525, 35-B4.
- Sandage, Allan, and Tammann, G. A. Steps toward the Hubble Constant. II. The Brightest Stars in Late-Type Spiral Galaxies, 191, 603, 47-A4.
- Sandage, Allan, and Tammann, G. A. Steps toward the Hubble Constant. III. The Distance and Stellar Content of the M101 Group of Galaxies, 194, 223, 77-A12.
- Sandage, Allan, and Tammann, G. A. Steps toward the Hubble Constant. IV. Distances to 39 Galaxies in the General Field Leading to a Calibration of the Galaxy Luminosity Classes and a First Hint of the Value of H_0 , 194, 559, 82-B5.
- Sanders, R. H., and Prendergast, K. H. The Possible Relation of the 3-Kiloparsec Arm to Explosions in the Galactic Nucleus, 188, 489, 16-D4.
- Sanders, Robert H. See Balick and Sanders, Radio Fine Structure in the Galactic Center, 192, 325, 54-G4.
- Sanders, W. T. See Williamson et al., Observations of Features in the Soft X-Ray Background Flux, 193, L133, 73-A1.
- Sandri, G. See Fish et al., The Fokker-Planck Coefficient for Pitch-Angle Scattering of Cosmic Rays, 190, 417, 32-F7.
- Sanduleak, N., and Dolan, J. F. Southern Radio Sources Possibly Identified with X-Ray Sources, 187, L73, 6-C10.
- Sanford, P. W. See Becklin et al., Infrared, Radio, and X-Ray Observations of Cygnus X-3, 192, L119, 61-E11.
- Sanford, P. W., Mason, K. O., Hawkins, F. J., Murdin, P., and Savage, A. *Copernicus* Observations of Variations in the X-Ray Flux from Cygnus X-1, 190, L55, 33-F7.
- Sanford, Peter. See Davidsen et al., Optical and X-Ray Observations of 3U 0614+09, 193, L25, 66-B9.
- Sanford, Peter W. See Margon et al., A Search for Soft X-Ray Emission from Red-Giant Coronae, 194, L75, 80-F1.
- Sanford, Peter W. See Mason et al., X-Ray Absorption Events in Cygnus X-1 Observed with *Copernicus*, 192, L65, 57-E13.
- Sanyal, A. Nova Delphini 1967. I. Spectroscopic Observations, 192, 574, 57-D6; Suppl. 28, 115 (No. 257).
- Sanyal, A., Weller, W., and Jeffers, S. Short-Term Spectral Variability of γ^2 Velorum. Photometric Observations, 187, L31, 3-D1.
- Sargent, Anneila I. See Greenstein and Sargent, The Nature of Faint Blue Stars in the Halo. II., 192, 813, 61-C11; Suppl. 28, 157 (No. 259).
- Sargent, W. L. W. See O'Connell et al., The Nature of Hoag's

- Object, **191**, 61, 39-E10.
- Sargent, W. L. W. See Hartwick and Sargent, The Mass of M31 as Determined from the Motions of its Globular Clusters, **190**, 283, 31-D3.
- Sargent, Wallace L. W. See Kormendy and Sargent, Tidal Effects as Criteria for Membership in Small Groups of Galaxies: Application to VV 166, **193**, 19, 63-B9.
- Sargent, Wallace L. W. See Turner and Sargent, The Nature of Small Groups of Galaxies in the Local Supercluster, **194**, 587, 82-D13.
- Saslaw, William C., Valtonen, Mauri J., and Aarseth, Sverre J. The Gravitational Slingshot and the Structure of Extragalactic Radio Sources, **190**, 253, 31-A13.
- Sastri, V. K., and Stothers, Richard. Influence of Opacity on the Pulsational Stability of Massive Stars with Uniform Chemical Composition. II. Modified Kramers Opacity, **193**, 677, 71-F7.
- Sato, T. See Harvey et al., Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission, **189**, L87, 24-F13.
- Savage, A. See Sanford et al., *Copernicus* Observations of Variations in the X-Ray Flux from Cygnus X-1, **190**, L55, 33-F7.
- Savage, Ann. See Mason et al., X-Ray Absorption Events in Cygnus X-1 Observed with *Copernicus*, **192**, L65, 57-E13.
- Savage, Blair D. See Jenkins and Savage, Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIV. An Extension of the Survey of Lyman- α Absorption from Interstellar Hydrogen, **187**, 243, 4-C1.
- Savage, Blair D., and Caldwell, John J. Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIII. The Albedos of Jupiter, Uranus, and Neptune, **187**, 197, 2-G8.
- Savage, Blair D., and Panek, Robert J. Ultraviolet Photometry from the Orbiting Astronomical Observatory. XVI. The Stellar Lyman- α Absorption Line, **191**, 659, 47-E5.
- Scalo, John M. Studies of Evolved Stars. IV. Band Strength Ratios as Indicators of Mixing from M, MS, and S Stars, **194**, 361, 78-E12.
- Scargle, Jeffrey D., Caroff, Lawrence J., and Tarter, C. Bruce. QSO Envelopes: Optically Thin, Low Density, and Normal Abundances?, **189**, 181, 22-B2.
- Schaak, D. F. See Houck et al., 20 to 40 Micron Spectroscopy of the Orion Nebula, **193**, L139, 73-A7.
- Schaefer, Henry F., III. See Pearson and Schaefer, Some Properties of H₂CN⁺: A Potentially Important Interstellar Species, **192**, 33, 50-C1.
- Scharlemann, Ernst T. Aligned Rotating Magnetospheres. II. Inclusion of Inertial Forces, **193**, 217, 65-B6.
- Schechter, Paul. See Press and Schechter, Formation of Galaxies and Clusters of Galaxies by Self-similar Gravitational Condensation, **187**, 425, 7-A3.
- Schechter, Paul. See Press and Schechter, Remark on the Statistical Significance of Flares in Poisson Count Data, **193**, 437, 68-D6.
- Scherf, F. See Reynolds et al., The Intensity Distribution of Diffuse Galactic H- α Emission, **192**, L53, 57-E2.
- Schiff, H. I., Hemsworth, R. S., Payzant, J. D., and Bohme, D. K. Laboratory Measurements of Some Ion-Molecule Reactions Related to the Formation of HCN in Dense Interstellar Clouds, **191**, L49, 42-D7.
- Schiffer, F. H., III, and Mathis, John S. The Scattering by Dust in the Orion Nebula, **194**, 597, 82-E8.
- Schild, R., Oke, J. B., and Searle, L. The Energy Distribution of the Very Red Star in NGC 6231, **188**, 71, 10-F4.
- Schild, Rudolph, Chaffee, Frederic, Frogel, Jay A., and Persson, S. Eric. The Nature of Infrared Excesses in Extreme Be Stars, **190**, 73, 28-F7.
- Schlesinger, Barry M. Constraints on the Evolutionary History of Stars Showing s-processed Material, **188**, 141, 11-D8.
- Schmadebeck, R. L. See Trombka et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. II. X-Ray Time Profile and Source Location, **194**, L27, 76-E2.
- Schmahl, E. J. See Foukal et al., Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount, **193**, L143, 73-A10.
- Schmahl, E. J. See Huber et al., Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from *Skylab*, **194**, L115, 81-B2.
- Schmahl, E. J. See Reeves et al., Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount, **188**, L27, 12-D11.
- Schmidt, Edward G., Rosenthal, Jeffrey D., and Jewsbury, C. P. A Comparison of Variable and Nonvariable Stars in the Cepheid Strip, **189**, 293, 23-C5.
- Schmidt, Maarten. On the Nature of Faint Blue Objects in High Galactic Latitudes. III. A Spectroscopic Search for Quasars in Four Survey Fields, **193**, 509, 70-A7.
- Schmidt, Maarten. Optical Spectra and Redshifts of 4C Quasi-stellar Radio Sources, **193**, 505, 70-A4; Erratum, **195**, 253, 3-D10.
- Schmidt, Maarten. See Greenstein et al., The Spectrum of the Polarized White Dwarf GD 229, **190**, L27, 30-F3.
- Schmiedekamp, Ann B. See Couch et al., s-Process Nucleosynthesis in Massive Stars: Core Helium Burning, **190**, 95, 29-A1.
- Schneider, Jean. See Bonazzola and Schneider, An Exact Study of Rigidly and Rapidly Rotating Stars in General Relativity with Application to the Crab Pulsar, **191**, 273, 41-F2.
- Schnopper, H. W. See Heinz et al., OSO-7 Observations of a High-Latitude X-Ray Source Associated with Abell Cluster A2052, **188**, L41, 15-D11.
- Schnopper, H. W. See McClintock et al., A Ten-Day Observations of Hercules X-1 from the OSO-7 Satellite, **188**, 159, 11-E9.
- Schnopper, H. W. See Sprott et al., Limit on X-Ray Emission from a Supernova during Maximum Light, **191**, 739, 48-C13.
- Schönfelder, V., and Lichten, G. Energy Spectrum and Evidence for Extragalactic Origin of Diffuse Gamma-Radiation in the MeV Range, **191**, L1, 42-A2.
- Schönfelder, V., and Lichten, G. Upper Limits to Soft Gamma-Ray Flux from Seven X-Ray Sources and from the Galactic Plane, **192**, L1, 53-A2.
- Schoonveld, L., and Sundaram, S. Electronic Transitions of the LaO Molecule, **191**, 288, 41-G2; Suppl. **27**, 307 (No. 246).
- Schoonveld, L., and Sundaram, S. Electronic Transitions of the ZrO Molecule: Triplet Systems, **192**, 207, 52-A1.
- Schramm, David N. See Arnett and Schramm, Origin of Cosmic Rays, Atomic Nuclei, and Pulsars in Explosions of Massive Stars (Erratum), **187**, L47, 3-D14.
- Schramm, David N. See Dearborn and Schramm, CNO Tricycling as an ¹⁷O Enrichment Mechanism, **194**, L67, 80-E6.
- Schramm, David N. See Epstein et al., Can Supernovae Produce Deuterium?, **190**, L13, 30-E3.
- Schramm, David N. See Gott et al., An Unbound Universe?, **194**, 543, 82-A4.
- Schramm, David N. See Lattimer and Schramm, Black-Hole-Neutron-Star Collisions, **192**, L145, 61-G11.
- Schramm, David N., and Tinsley, Beatrice M. On the Origin and Evolution of s-Process Elements, **193**, 151, 64-D12.
- Schreier, E. See Avni et al., Upper Limit on 2.5-Second Pulsations from Hercules X-1, **188**, L35, 15-D6.
- Schreier, E. See Brinkman et al., Correlation Analysis of X-Ray Emission from Cygnus X-1, **188**, 603, 17-E3.
- Schreier, E. See Forman et al., *Uhuru* Observation of Short-Time-Scale Variations of the Crab, **193**, L67, 69-C12.
- Schreier, E. See Giacconi et al., The Third *Uhuru* Catalog of X-Ray Sources, **188**, 667, 18-B12; Suppl. **27**, 37 (No. 237).
- Schupler, B. See Becklin et al., Infrared, Radio, and X-Ray Observations of Cygnus X-3, **192**, L119, 61-E11.
- Schwartz, Daniel A. Can the Constraint of Finite Mass Smooth Fluctuations in the Background Radiation?, **194**, L139, 84-E11.
- Schwartz, Daniel A., and Peterson, Laurence E. The Spectrum of Diffuse Cosmic X-Rays Observed by OSO-3 between 7 and 100 keV, **190**, 297, 31-E3.
- Schwartz, P. R. See Snyder et al., Radio Detection of Interstellar Dimethyl Ether, **191**, L79, 46-C7.
- Schwartz, P. R. See Wilson et al., Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters, **191**, 357, 43-E11.

- Schwartz, P. R., Harvey, P. M., and Barrett, A. H. Time Variation of the H₂O Maser and Infrared Continuum in Late-Type Stars, **187**, 491, 7-E9.
- Schwartz, Philip R. See Spencer and Schwartz, Radio Emission from Pre-Main-Sequence Stars, **188**, L105, 18-E1.
- Schwartz, R. D. See Böhm et al., The Continuous Spectrum of Herbig-Haro Objects, **193**, 353, 67-E4.
- Schwartz, Richard D. The T Tauri Emission Nebula, **191**, 419, 44-C3.
- Schwarzschild, M. See Light et al., The Nucleus of M31, **194**, 257, 77-D7.
- Scott, John. See Hintzen et al., Are All Blue Stragglers Close Binaries?, **194**, 657, 83-C2.
- Scott, John S. See Grandi et al., The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis, **190**, 365, 32-C1.
- Scott, R. L. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, **191**, 51, 39-E1.
- Scoville, N. See Gatley et al., A New Infrared Complex and Molecular Cloud in Orion, **191**, L121, 49-B6.
- Scoville, N. Z., and Solomon, P. M. Radiative Transfer, Excitation, and Cooling of Molecular Emission Lines (CO and CS), **187**, L67, 6-C5.
- Scoville, N. Z., Solomon, P. M., and Jefferts, K. B. Molecular Clouds in the Galactic Nucleus, **187**, L63, 6-C1.
- Scoville, Nick. See Kwan and Scoville, Radiative Trapping and Population Inversions of the SiO Masers, **194**, L97, 80-G7.
- Scudder, J. D. See Burlaga and Scudder, Sweet's Mechanism in the Solar Wind, **191**, L149, 49-D3.
- Sequist, E. R. See Gregory and Sequist, The Nature of Cygnus X-3 Radio Outbursts from an Analysis of Radiofrequency Spectra, **194**, 715, 83-G1.
- Sequist, E. R. See Hughes et al., Daily Observations of Cygnus X-3 at 10.5 GHz during the Period 1973 July–October, **191**, 749, 48-D10.
- Searle, L. See Schild et al., The Energy Distribution of the Very Red Star in NGC 6231, **188**, 71, 10-F4.
- Searle, Leonard. See Greenstein et al., The Spectrum of the Polarized White Dwarf GD 229, **190**, L27, 30-F3.
- Seeman, N. See Share et al., Diffuse Cosmic Gamma Radiation above 10 MeV, **187**, 511, 7-G2.
- Seeman, N. See Share et al., Observation of Gamma-Radiation from the Galactic Center Region, **187**, 45, 1-D1.
- Seielstad, G. A. The Rapidly Variable Radio Source 3C 120, **193**, 55, 63-E2.
- Serkowski, K. See Carswell et al., Optical Observations of the Radio Source 0735+178, **190**, L101, 27-E11.
- Serlemitsos, P. J. See Holt et al., A New Measurement of the Hercules X-1 X-Ray Pulse Profile, **190**, L109, 37-F7.
- Serlemitsos, P. J. See Holt et al., On the Nature of the Unidentified High-Latitude Uhuru Sources, **188**, L97, 18-D8.
- Serlemitsos, P. J. See Rothschild et al., Millisecond Temporal Structure in Cygnus X-1, **189**, L13, 20-G11.
- Seward, F. See Hill et al., An Unusual X-Ray Source in Scutum, **189**, L69, 24-E9.
- Seward, F. D. See Hill et al., A Search for Soft X-Ray Sources in the Galactic Anticenter. Absorption of X-Rays from the Crab Nebula, **187**, 505, 7-F9.
- Shaffer, D. B. See Kellermann et al., Further Observations of Apparent Changes in the Structure of 3C 273 and 3C 279, **189**, L19, 21-A3.
- Shaffer, David B., and Shields, Gregory A. A Search for Additional Radio Sources in the Kukarkin Variable Star Catalog, **192**, L83, 57-G1.
- Shapiro, I. I. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, **193**, 293, 67-A4.
- Shapiro, Stuart L. Accretion onto Black Holes: The Emergent Radiation Spectrum. III. Rotating (Kerr) Black Holes, **189**, 343, 23-F12.
- Shapiro, Stuart L. See Elliot and Shapiro, On the Variability of the Compact Nonthermal Sources, **192**, L3, 53-A4.
- Share, G. H., Kinzer, R. L., and Seeman, N. Diffuse Cosmic Gamma Radiation above 10 MeV, **187**, 511, 7-G2.
- Share, G. H., Kinzer, R. L., and Seeman, N. Observation of Gamma-Radiation from the Galactic Center Region, **187**, 45, 1-D1.
- Shawhan, Stanley D. See Spangler et al., Four-Stokes-Parameter Radiofrequency Polarimetry of a Flare from AD Leonis, **194**, L43, 76-F2.
- Shawhan, Stanley D. See Spangler et al., Short-Duration Radio Flares of UV Ceti Stars, **190**, L129, 37-G9.
- Shectman, Stephen A. The Small-Scale Anisotropy of the Cosmic Light, **188**, 233, 13-B12.
- Sheffield, Charles. See Adams et al., Analytic Pulsar Models, **192**, 525, 57-A1.
- Shields, G. A. Composition Gradients Across Spiral Galaxies, **193**, 335, 67-D2.
- Shields, G. A. X-Ray Ionization and the Helium Abundance in 3C 120, **191**, 309, 43-B8.
- Shields, Gregory A. See Shaffer and Shields, A Search for Additional Radio Sources in the Kukarkin Variable Star Catalog, **192**, L83, 57-B1.
- Shine, Richard. See Gerola et al., Evidence for a Corona of Beta Geminorum, **193**, L107, 72-F1.
- Shine, Richard A. See Ayres et al., Stellar Model Chromospheres. II. Procyon (F5 IV-V), **192**, 93, 50-G7.
- Shirk, E. K. Observation of Transiron Solar-Flare Nuclei in an Apollo 16 Command Module Window, **190**, 695, 37-A12.
- Shore, Bruce W. See Weisheit and Shore, Plasma-screening Effects upon Atomic Hydrogen Photoabsorption, **194**, 519, 80-C6.
- Shore, Steven N., and Adelman, Saul J. Magnetic Fields and Diffusion Processes in Peculiar A Stars, **191**, 165, 40-E11.
- Shostak, G. S. A Distance Limit for NGC 7318B in Stephan's Quintet, **189**, L1, 20-G1.
- Shostak, G. S. H₁ Emission from Stephan's Quintet, **187**, 19, 1-B4.
- Shulman, S., Bortolot, B. J., and Thaddeus, P. Weak Interstellar Lines in the Visible Spectrum of Zeta Ophiuchi, **193**, 97, 64-A1.
- Siegmund, W. A. See Böhm et al., The Continuous Spectrum of Herbig-Haro Objects, **193**, 353, 67-E4.
- Silk, J. K. See Golub et al., Solar X-Ray Bright Points, **189**, L93, 24-G5.
- Silk, Joseph. Large-Scale Inhomogeneity of the Universe: Implications for the Deceleration Parameter, **193**, 525, 70-B11.
- Silk, Joseph. The Primordial Generation of Random Shear Motions and Small-Scale Angular Anisotropy in the Microwave Background Radiation, **194**, 215, 77-A4.
- Silk, Joseph. See Burke and Silk, Dust Grains in a Hot Gas. I. Basic Physics, **190**, 1, 28-A4.
- Silk, Joseph. See Silk and Silk, On the Velocity Dependence of the Interstellar Na I/Ca II Ratio, **192**, 51, 50-D4.
- Silk, Joseph, and Burke, John Robert. Dust Grains in a Hot Gas. II. Astrophysical Applications, **190**, 11, 28-A14.
- Siluk, Richard S., and Silk, Joseph. On the Velocity Dependence of the Interstellar Na I/ Ca II Ratio, **192**, 51, 50-D4.
- Simon, M. See Gezari et al., 350-Micron Mapping of the Orion Molecular Cloud, **191**, L33, 42-C7.
- Sinclair, M. W. See Fourakis et al., A Search for Interstellar Nitroxyl (HNO), **194**, 41, 74-D8.
- Siquig, R. See Lauterborn and Siquig, Multiple Solutions and Secular Stability of a 7 M_○ Star with Core Helium and Shell Hydrogen Burning, **187**, 299, 4-F12.
- Siquig, R. A. See Lauterborn and Siquig, Island Solutions in Linear Series of Static Stellar Models with Core Helium and Shell Hydrogen Burning for M = 5, 7, and 9 M_○, **191**, 589, 45-G11.
- Sistla, Gopal, Kojoian, G., and Chaisson, E. J. Radio-Continuum Measurements of Planetary Nebulae at 15.5 GHz, **192**, 165, 51-E1.
- Skalafuris, Angelo James. The Doppler Splitting of Spectral Lines in Pulsating Stars, **190**, 91, 28-G10.
- Slattery, W. L. See Anderson et al., Structure of the Jovian

- Envelope from *Pioneer 10* Gravity Data, **193**, L149, 73-B3.
- Smith, A. G. See Andrew et al., BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations, **191**, 51, 39-E1.
- Smith, Andrew M. Interstellar Lines in the Ultraviolet Spectrum of Delta Scorpii, **190**, 565, 35-F2.
- Smith, Andrew M. See Morton et al., A New Limit on the Interstellar Abundance of Boron, **189**, L109, 27-C11.
- Smith, Barham W. See Cox and Smith, Large-Scale Effects of Supernova Remnants on the Galaxy: Generation and Maintenance of a Hot Network of Tunnels, **189**, L105, 27-C7.
- Smith, Dale W. See Hodge and Smith, The Structure of the Fornax Dwarf Galaxy, **188**, 19, 10-B6.
- Smith, Dean F., and Krall, N. A. The Impossibility of Plasma Radiation from Electron Plasma Wave Turbulence within Collisionless Shock Waves, **194**, L163, 84-G8.
- Smith, E. W. See Mihalas et al., He I $\lambda\lambda 4471$ Profiles in B Stars: Calculations with an Improved Line-broadening Theory, **190**, 315, 31-F6.
- Smith, Harding. See Davidsen et al., Optical and X-Ray Observations of 3U 0614+09, **193**, L25, 66-B9.
- Smith, J. R. See Hackwell et al., Infrared Photometry of Wolf-Rayet Stars from 2.3 to 23 Microns, **192**, 383, 55-D11.
- Smith, Malcolm G. See Bohuski and Smith, Old Planetary Nebulae and the Relation between Size and Expansion Velocity, **193**, 197, 65-A1.
- Smith, Malcolm G. See Osmer et al., The Nuclei of Peculiar Emission-Line Galaxies, **192**, 279, 54-C12.
- Smith, Malcolm G. See Osmer et al., The Southern Seyfert Galaxies NGC 1566 and NGC 3783, **189**, 187, 22-B8.
- Smith, Malcolm G. See Spinrad et al., Two Mira Variables in the Stellar System Terzan 5, **192**, 405, 55-F8.
- Smith, Myron A. Metallicity in Border Regions of the Am Domain. III. Analysis of the Hot Stars Alpha Geminorum A and B and Theta Leonis, **189**, 101, 20-A7.
- Smith, Myron A. Observed Departures from LTE in Stellar Fe I Lines. I. The Sun, **190**, 481, 33-D1.
- Smith, Myron A. Observed Departures from LTE in Stellar Fe I Lines. II. Arcturus, **192**, 623, 59-D9.
- Smith, Myron A. See Rydgren and Smith, An Empirical Line Blanketing Study of Am Stars, **193**, L25, 64-C1.
- Smith, Richard L. See Sackmann et al., Carbon and Eruptive Stars: Surface Enrichment of Lithium, Carbon, Nitrogen, and ^{13}C by Deep Mixing, **187**, 555, 8-C5.
- Smith, Robert A. See Papadopoulos et al., Stabilization of Electron Streams in Type III Solar Radio Bursts, **190**, 175, 29-F7.
- Smith, Robert A., and Wu, C. S. Implications of the *Pioneer 10* Measurements of the Jovian Magnetic Field for Theories of Io-modulated Decametric Radiation, **190**, L91, 34-A13; Addendum, **193**, L101, 69-F2.
- Smith, Wm. Hayden. See Brooks and Smith, Radiative and Pre-dissociation Probabilities for Individual Rotational Levels of the $B^{\pm}\Sigma$ State of CH with Application to the Radiative Recombination of CH in the Interstellar Medium, **194**, 513, 80-C1.
- Smith, Wm. Hayden. See Erman et al., Oscillator Strengths for Neutral Sodium and the Interstellar Sodium Abundance in Zeta Ophiuchi, **192**, 59, 50-D11.
- Sneden, C. See Lambert et al., The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. II. CN and CO in Alpha Orionis, **193**, 621, 71-B4.
- Sneden, C. See Lambert et al., The Oxygen Abundance in the Metal-deficient Star HD 122563, **188**, 97, 11-A9.
- Sneden, Christopher. Carbon and Nitrogen Abundances in Metal-poor Stars, **189**, 493, 26-A4.
- Snow, Theodore P., Jr., and Cohen, Judith G. Diffuse Interstellar Band Formation in Dense Clouds, **194**, 313, 78-B2.
- Snyder, L. E. See Zuckerman et al., $^{12}\text{C}/^{13}\text{C}$ Abundance Ratios from Observations of Interstellar $\text{H}_2^{13}\text{C}^{16}\text{O}$, **189**, 217, 22-D7.
- Snyder, L. E., and Buhl, D. Detection of Possible Maser Emission near 3.48 Millimeters from an Unidentified Molecular Species in Orion, **189**, L31, 21-B1.
- Snyder, L. E., Buhl, D., Schwartz, P. R., Clark, F. O., Johnson, D. R., Lovas, F. J., and Giguere, P. T. Radio Detection of Interstellar Dimethyl Ether, **191**, L79, 46-C7.
- Snyder, Lewis E. See Buhl et al., Silicon Monoxide: Detection of Maser Emission from the Second vibrationally Excited State, **192**, L97, 58-A1.
- Snyder, Lewis E. See Clark et al., Observational Evidence for the Excitation of HCN and H₂O in Protostellar Molecular Clouds, **190**, 545, 35-D10.
- Sofia, S., and Van Horn, H. M. The Origin of the Cosmic Gamma-Ray Bursts, **194**, 593, 82-E5.
- Sofia, Sabatino. The Bright Stars Associated with Galactic X-Ray Sources, **188**, L45, 15-D14.
- Soifer, B. T., and Hudson, H. S. Submillimeter Observations of the Orion Nebula and NGC 2024, **191**, L83, 46-C11.
- Soifer, B. T. See Merrill and Soifer, Spectrophotometric Observations of a Highly Absorbed Object in Cygnus, **189**, L27, 21-A11.
- Soifer, Baruch T. See Pipher et al., Infrared Observations of the Radio Source G30.8-0.0 in the W43 Complex, **193**, 283, 65-F13.
- Solinger, A. See Rappaport et al., X-Ray Structure of the Cygnus Loop, **194**, 329, 78-C3.
- Solomon, P. See Harrison et al., Hartree-Fock Bound States for Molecule-Ions HeC $^{2+}$ and HeC $^{+}$, **189**, 605, 27-B2.
- Solomon, P. M. See Liszt et al., CO and CS in the Orion Nebula, **190**, 557, 35-E8.
- Solomon, P. M. See Scoville and Solomon, Radiative Transfer, Excitation, and Cooling of Molecular Emission Lines (CO and CS), **187**, L67, 6-C5.
- Solomon, P. M. See Scoville et al., Molecular Clouds in the Galactic Nucleus, **187**, L63, 6-C1.
- Spada, G., Bradt, H., Doxsey, R., Levine, A., and Rappaport, S. Limits on Rapid X-Ray Pulsing in X-Ray Binaries, **190**, L113, 37-F10.
- Spangler, Steven R., Rankin, John M., and Shawhan, Stanley D. Four-Stokes-Parameter Radiofrequency Polarimetry of a Flare from AD Leonis, **194**, L43, 76-F2.
- Spangler, Steven R., Shawhan, Stanley D., and Rankin, John M. Short-Duration Radio Flares of UV Ceti Stars, **190**, L129, 37-G9.
- Sparks, Warren M. See Kutter and Sparks, Studies of Hydrodynamic Events in Stellar Evolution. III. Ejection of Planetary Nebulae, **192**, 447, 56-B9.
- Sparks, Warren M. See Starrfield et al., CNO Abundances and Hydrodynamic Models of the Nova Outburst. II. $1.00 M_{\odot}$ Models with Enhanced Carbon and Oxygen, **192**, 817, 61-C13; Suppl. **28**, 247 (No. 261).
- Sparks, Warren M. See Starrfield et al., CNO Abundances and Hydrodynamic Models of the Nova Outburst. III. $0.5 M_{\odot}$ Models with Enhanced Carbon, Oxygen, and Nitrogen, **192**, 647, 59-F5.
- Sparks, Warren M., and Stecher, Theodore P. Supernova: The Result of the Death Spiral of a White Dwarf into a Red Giant, **188**, 149, 11-E1.
- Spear, G. G., Kondo, Y., and Henize, K. G. Ultraviolet Spectrophotometry of Sirius from *Gemini 12*, **192**, 615, 59-D2.
- Spencer, John H., and Schwartz, Philip R. Radio Emission from Pre-Main-Sequence Stars, **188**, L105, 18-E1.
- Spinrad, Hyron. See Davidsen et al., Optical and X-Ray Observations of 3U 0614+09, **193**, L25, 66-B9.
- Spinrad, Hyron, Smith, Malcolm G., and Harlan, Eugene. Two Mira Variables in the Stellar System Terzan 5, **192**, 405, 55-F8.
- Spitzer, Lyman, Jr., Cochran, William D., and Hirshfield, Alan. Column Densities of Interstellar Molecular Hydrogen, **193**, 759, 72-E4; Suppl. **28**, 373 (No. 266).
- Spitzer, Lyman, Jr., and Zweibel, Ellen Gould. On the Theory of H₂ Rotational Excitation, **191**, L127, 49-B10.
- Sprott, G. F. See Heinz et al., OSO-7 Observations of a High-Latitude X-Ray Source Associated with Abell Cluster A2052, **188**, L41, 15-D11.
- Sprott, G. F. See McClintock et al., A Ten-Day Observation of Hercules X-1 from the OSO-7 Satellite, **188**, 159, 11-E9.
- Sprott, G. F., Bradt, H. V., Clark, G. W., Lewin, W. H. G., Schnopper, H. W., Pigatto, L., and Rosino, L. Limit on X-Ray

- Emission from a Supernova during Maximum Light, **191**, 739, 48-C13.
- Sramek, R. A. See Wardle and Sramek, The Polarization of Normal Galaxies at Radio Wavelengths, **189**, 399, 25-A4.
- Sramek, R. A., and Tovmassian, H. M. Markarian 348: A Variable Radio Source, **191**, L13, 42-A13.
- Sramek, R. A., and Tovmassian, H. M. Radio Emission from Markarian 6, **191**, 633, 47-C11.
- Stachnik, R. V. See Labeyrie et al., Speckle Interferometry. III. High-Resolution Measurements of Twelve Close Binary Systems, **194**, L147, 84-F5.
- Stallop, James R. Absorption of Infrared Radiation by Electrons in the Field of a Neutral Hydrogen Atom, **187**, 179, 2-F7.
- Stark, A. See Becklin et al., Infrared, Radio, and X-Ray Observations of Cygnus X-3, **192**, L119, 61-E11.
- Starrfield, Sumner, Sparks, Warren M., and Truran, J. W. CNO Abundances and Hydrodynamic Models of the Nova Outburst. II. $1.00 M_{\odot}$ Models with Enhanced Carbon and Oxygen, **192**, 817, 61-C13; Suppl. **28**, 247 (No. 261).
- Starrfield, Sumner, Sparks, Warren M., and Truran, James W. CNO Abundances and Hydrodynamic Models of the Nova Outburst. III. $0.5 M_{\odot}$ Models with Enhanced Carbon, Oxygen, and Nitrogen, **192**, 647, 59-F5.
- Stecher, Theodore P. See Heap and Stecher, Two New Physical Processes in the Far-Ultraviolet Spectrum of Zeta Tauri, **187**, L27, 3-C10.
- Stecher, Theodore P. See Krishna Swamy and Stecher, Non-LTE H_2^+ as the Source of Missing Opacity in the Solar Atmosphere, **194**, L153, 84-F12.
- Stecher, Theodore P. See Morton et al., A New Limit on the Interstellar Abundance of Boron, **189**, L109, 27-C11.
- Stecher, Theodore P. See Sparks and Stecher, Supernova: The Result of the Death Spiral of a White Dwarf into a Red Giant, **188**, 149, 11-E1.
- Stecker, F. W. See Puget and Stecker, The Distribution of Cosmic Rays in the Galaxy and their Dynamics as Deduced from Recent γ -Ray Observations, **191**, 323, 43-C7.
- Stecker, F. W., Puget, J. L., Strong, A. W., and Bredekamp, J. H. Possible Evidence for Structured Acceleration of Cosmic Rays on a Galactic Scale from Recent γ -Ray Observations, **188**, L59, 15-E13.
- Stein, W. A. See Jones et al., Physics of Compact Nonthermal Sources. I. Theory of Radiation Processes, **188**, 353, 14-D2.
- Stein, W. A. See Jones et al., Physics of Compact Nonthermal Sources. II. Determination of Physical Parameters, **192**, 261, 54-B8.
- Stein, W. A., Gillett, F. C., and Merrill, K. M. Observations of the Infrared Radiation from the Nuclei of NGC 1068 and NGC 4151, **187**, 213, 4-A3.
- Steinitz, R. See Gebbie and Steinitz, On Spatial Variations in the Intensity of Chromospheric $H\alpha$, **188**, 399, 14-G6.
- Stellingwerf, R. F. The Calculation of Periodic Pulsations of Stellar Models, **192**, 139, 51-C5.
- Stephenson, C. B. Spectroscopic Observations of Interesting Southern Stars Noted on Southern Objective-Prism Plates, **191**, 685, 47-G4.
- Steyer, T. R. See Day et al., A Quantitative Study of Silicate Extinction, **191**, 415, 44-B13.
- Stickney, Philip M. See Grandi et al., The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis, **190**, 365, 32-C1.
- Stockman, H. S., Jr. See Woodgate et al., Detection of the [Fe XIV] Coronal Line at 5303 Å in the Cygnus Loop, **188**, L79, 18-C6.
- Stockton, Alan. On the Tidal Origin of the Bridge of Arp 295, **190**, L47, 33-F1.
- Stockton, Alan. Spectroscopic Observations of NGC 4676, **187**, 219, 4-A8.
- Stoeckley, Thomas R., and Morris, Charles S. Rotational Distortion of Stellar Absorption Lines. I. Parameters from Photographic Spectra, **188**, 579, 17-C6.
- Stoering, J. See Hill et al., An Unusual X-Ray Source in Scutum, **189**, L69, 24-E9.
- Stoering, J. P. See Hill et al., A Search for Soft X-Ray Sources in the Galactic Anticenter. Absorption of X-Rays from the Crab Nebula, **187**, 505, 7-F9.
- Stokes, R. A. See Michalsky et al., Interstellar Circular Polarization: A Report of Eight New Positive Results, **187**, L13, 3-B11.
- Stone, E. C. See Hurford et al., The Energy Spectrum of 0.16 to 2 MeV Electrons during Solar Quiet Times, **192**, 541, 57-B2.
- Stone, P. H. See Trafton and Stone, Radiative-Dynamical Equilibrium States for Jupiter, **188**, 649, 18-A10.
- Stone, Remington P. S. Spectral Energy Distributions of Standard Stars of Intermediate Brightness. I., **193**, 135, 64-C10.
- Stoner, Ronald E., Ptak, Roger, and Ellis, David. The Interpretation of Broad Emission Lines in High-Redshift QSOs, **191**, 291, 43-A4.
- Stothers, R. See Carson et al., Solar Neutrinos and the Influence of Radiative Opacities on Solar Models, **194**, 743, 84-A12.
- Stothers, Richard. The Apsidal-Motion Test for Models of Main-Sequence Stars, **194**, 651, 83-B11.
- Stothers, Richard. A Comparison of Homogeneous Stellar Models Based on the Cox-Stewart and Carson Opacities, **194**, 695, 83-E9.
- Stothers, Richard. Influence of Rotation on the Maximum Mass of Pulsationally Stable Stars, **192**, 145, 51-C11.
- Stothers, Richard. Violation of the Vogt-Russell Theorem for Homogeneous Nondegenerate Stars, **194**, 699, 83-E12.
- Stothers, Richard. See Sastri and Stothers, Influence of Opacity on the Pulsational Stability of Massive Stars with Uniform Chemical Composition. II. Modified Kramers Opacity, **193**, 677, 71-F7.
- Straka, W. C. Numerical Models of the Evolution of Supernova Remnants: The Shell-Formation Stage, **190**, 59, 28-E5.
- Strittmatter, P. A. See Angel et al., Discovery of a Magnetic DA White Dwarf, **194**, L47, 76-F6.
- Strittmatter, P. A. See Angel et al., G240-72: A New Magnetic White Dwarf with Unusual Polarization, **190**, L71, 33-G9.
- Strittmatter, P. A. See Carswell et al., Optical Observations of the Radio Source 0735+178, **190**, L101, 37-E11.
- Strittmatter, P. A. See Hintzen and Strittmatter, A Spectroscopic Search for Cool White Dwarfs, **193**, L111, 72-F5.
- Strittmatter, P. A., Carswell, R. F., Gilbert, G., and Burbidge, E. M. Spectroscopic Observations of Objects Identified with Radio Sources, **190**, 509, 35-A4.
- Strobel, Darrell F. Hydrocarbon Abundances in the Jovian Atmosphere, **192**, L47, 53-D5.
- Strom, K. M. See Strom et al., Infrared Observations of H II Regions in External Galaxies, **193**, L7, 66-A8.
- Strom, K. M. See Strom et al., Infrared and Optical Observations of Herbig-Haro Objects, **191**, 111, 40-B6.
- Strom, K. M., Strom, S. E., and Grasdalen, G. L. An Infrared Source Associated with a Herbig-Haro Object, **187**, 83, 1-F12.
- Strom, K. M., Strom, S. E., and Kinman, T. D. Optical Polarization of Selected Herbig-Haro Objects, **191**, L93, 46-D6.
- Strom, S. E. See Strom et al., An Infrared Source Associated with a Herbig-Haro Object, **187**, 83, 1-F12.
- Strom, S. E. See Strom et al., Optical Polarization of Selected Herbig-Haro Objects, **191**, L93, 46-D6.
- Strom, S. E., Grasdalen, G. L., and Strom, K. M. Infrared and Optical Observations of Herbig-Haro Objects, **191**, 111, 40-B6.
- Strom, S. E., Strom, K. M., Grasdalen, G. L., and Capps, R. W. Infrared Observations of H II Regions in External Galaxies, **193**, L7, 66-A8.
- Strom, Stephen E. See Dickinson et al., A Strong Water Maser Associated with a Herbig-Haro Object, **194**, L93, 80-G4.
- Strong, A. W. See Stecker et al., Possible Evidence for Structured Acceleration of Cosmic Rays on a Galactic Scale from Recent γ -Ray Observations, **188**, L59, 15-E13.
- Strong, I. B. See Imhof et al., Spectra Measurements of a Cosmic Gamma-Ray Burst with Fast Time Resolution, **191**, L7, 42-A7.
- Strong, Ian B., Klebesadel, Ray W., and Olson, Roy A. A Preliminary Catalog of Transient Cosmic Gamma-Ray Sources Observed by the *Vela* Satellites, **188**, L1, 12-C2.

- Studier, Martin H. See Anders et al., Interstellar Molecules: Origin by Catalytic Reactions on Grain Surfaces?, **192**, L101, 58-A5.
- Sundaram, S. See Schoonveld and Sundaram, Electronic Transitions of the LaO Molecule, **191**, 288, 41-G2; Suppl. 27, 307 (No. 246).
- Sundaram, S. See Schoonveld and Sundaram, Electronic Transitions of the ZrO Molecule: Triplet Systems, **192**, 207, 52-A1.
- Surmelian, G. L., and O'Connell, R. F. Energy Spectrum of Hydrogen-like Atoms in a Strong Magnetic Field, **190**, 741, 37-D13.
- Surmelian, G. L., and O'Connell, R. F. Quadratic Zeeman Effect in the Hydrogen Balmer Lines from Magnetic White Dwarfs, **193**, 705, 72-A6.
- Sutherland, P. G. See Ruderman and Sutherland, Rotating Superfluid in Neutron Stars, **190**, 137, 29-C14.
- Sutherland, Peter G. See Chen et al., Structure of Solid Iron in Superstrong Neutron-Star Magnetic Fields, **191**, 473, 44-F13.
- Sutton, E., Becklin, E. E., and Neugebauer, G. 34-Micron Observations of Eta Carinae, G333.6-0.2, and the Galactic Center, **190**, L69, 33-G7.
- Swartz, M. See Kastner et al., Solar-Flare Emission Lines in the Range from 66 to 171 Å; $2s^2 2p^k - 2s^1 2p^{k+1}$ Transitions in Highly Ionized Iron, **191**, 261, 41-E3.
- Swedlund, J. B. See Michalsky et al., Interstellar Circular Polarization: A Report of Eight New Positive Results, **187**, L13, 3-B11.
- Swedlund, John B. See Kemp et al., DQ Herculis: Periodic Linear Polarization Synchronous with the Rapid Light Variations, **193**, L15, 66-B1.
- Swedlund, John B. See Kemp et al., On the Linear Polarization of GD-229, **189**, L79, 24-F6.
- Swedlund, John B., Kemp, James C., and Wolstencroft, Ramon D. DQ Herculis: Periodic Circular Polarization Synchronous with the Rapid Light Variations, **193**, L11, 66-A12.
- Swedlund, John B., Wolstencroft, Ramon D., Michalsky, Joseph J., Jr., and Kemp, James C. Discovery of Time-Varying Circular and Linear Polarization in the White-Dwarf Suspect GD 229, **187**, L121, 9-E12.
- Swegart, Allen V. Do Helium-Shell Flashes Cause Extensive Mixing in Low-Mass Stars?, **189**, 289, 23-C2.
- Swegart, Allen V. See Demarque et al., Rotating Solar Models with Low Neutrino Fluxes (Erratum), **187**, 423, 6-A4.
- Swegart, Allen V., and Gross, Peter G. Horizontal-Branch Evolution with Semiconvection. I. Interior Evolution, **190**, 101, 29-A7.
- Swihart, T. L. See Pacholczyk and Swihart, Polarization of Radio Sources. V. Absorption Effects on Circular Repolarization in Compact Sources, **192**, 591, 59-B8.
- Szkody, P. See Böhm-Vitense et al., Masses and Luminosities of Population II Cepheids, **194**, 125, 75-C6.
- Szkody, Paula. Infrared Photometry of SS Cygni and RX Andromedae near Maximum, **192**, L75, 57-F8.
- Szkody, Paula. See Böhm-Vitense and Szkody, *UBVR* Colors for Population II Giants, **193**, 607, 71-A4.
- Taam, R. E. See Prendergast and Taam, Numerical Simulation of the Gas Flow in Close Binary Systems, **189**, 125, 20-C3.
- Takagi, K. See Fourikis et al., Detection of Interstellar Methyamine by its 202 110 Å-A₂-State Transition, **191**, L139, 49-C8.
- Takagi, K. See Kaifu et al., Detection of Interstellar Methyamine, **191**, L135, 49-C5.
- Takakura, Tatsuo. See Vorpahl and Takakura, Rise Time in 20-32 keV Impulsive X-Radiation, **191**, 563, 45-E13.
- Talbot, Raymond J., Jr. The Negative Correlation between the Carbon-to-Iron Ratio and the Iron Abundance, **192**, 643, 59-F1.
- Talbot, Raymond J., Jr. Sensitivity of the Star Formation Rate to the Interstellar Gas Abundance of Heavy Elements, **188**, 209, 22-C14.
- Talbot, Raymond J., Jr., and Arnett, W. David. Some Recent Results from Galactic and Stellar Evolution Theory, **190**, 605, 36-A11.
- Tammann, G. A. See Sandage and Tammann, Steps toward the Hubble Constant. I. Calibration of the Linear Sizes of Extragalactic H II Regions, **190**, 525, 35-B4.
- Tammann, G. A. See Sandage and Tammann, Steps toward the Hubble Constant. II. The Brightest Stars in Late-Type Spiral Galaxies, **191**, 603, 47-A4.
- Tammann, G. A. See Sandage and Tammann, Steps toward the Hubble Constant. III. The Distance and Stellar Content of the M101 Group of Galaxies, **194**, 223, 77-A12.
- Tammann, G. A. See Sandage and Tammann, Steps toward the Hubble Constant. IV. Distances to 39 Galaxies in the General Field Leading to a Calibration of the Galaxy Luminosity Classes and a First Hint of the Value of H_0 , **194**, 559, 82-B5.
- Tanaka, Y. See de Korte et al., Observation of Enhanced Soft X-Ray Emission from the Vicinity of the North Polar Spur, **190**, L5, 30-D7.
- Tanaka, K. See Nakagawa and Tanaka, Dynamics of the Solar Magnetic Field. IV. Examples of Force-free Magnetic-Field Evolution in Response to Photospheric Motions, **190**, 711, 37-B13.
- Tananabaum, H. See Avni et al., Upper Limit on 2.5-Second Pulsations from Hercules X-1, **188**, L35, 15-D6.
- Tananabaum, H. See Brinkman et al., Correlation Analysis of X-Ray Emission from Cygnus X-1, **188**, 603, 17-E3.
- Tananabaum, H. See Forman et al., *Uhuru* Observations of Short-Time-Scale Variations of the Crab, **193**, L67, 69-C12.
- Tananabaum, H. See Giacconi et al., The Third *Uhuru* Catalog of X-Ray Sources, **188**, 667, 18-B12; Suppl. 27, 37 (No. 237).
- Tananabaum, H. See Jones et al., Observations of Circinus X-1 from *Uhuru*, **191**, L71, 46-B13.
- Tarter, C. Bruce. See Scargle et al., QSO Envelopes: Optically Thin, Low Density, and Normal Abundances?, **189**, 181, 22-B2.
- Tarter, C. Bruce. See Weisheit and Tarter, Implications of the Copernicus Observations of Unreddened Stars (Erratum), **188**, L77, 15-F13.
- Tassoul, Jean-Louis. See Dedic and Tassoul, A Case of Metastability for Slowly Rotating, Supermassive Objects, **188**, 173, 11-F11.
- Taylor, J. H. See Hulse and Taylor, A High-Sensitivity Pulsar Survey, **191**, L59, 46-B3.
- Taylor, J. H. See Manchester and Taylor, Period Irregularities in Pulsars, **191**, L63, 46-B6.
- Taylor, J. H. See Manchester et al., Detection of Pulsar Proper Motion, **189**, L119, 27-D6.
- Taylor, Keith. See Münch and Taylor, On the Spectrum of Neutral Oxygen in the Orion Nebula, **192**, L93, 57-G10.
- Taylor, P. O. See Crandall et al., Rate Coefficients for Electron Excitation of the First Resonance Transition in H, Li, Na, Ca, Ca⁺, and Ba⁺ Calculated from Experimental Data, **191**, 789, 48-G5.
- Teegarden, B. J. See McDonald et al., The Anomalous Abundance of Cosmic-Ray Nitrogen and Oxygen Nuclei at Low Energies, **187**, L105, 9-D12.
- Temkin, A. See Jacobs et al., Radiative Transitions Involving the $(2p^2)P$ Metastable Autodetaching State of H⁺, **191**, 785, 48-G1.
- Terrell, Richard J. See Westphal et al., Five-Micron Pictures of Jupiter, **188**, L111, 18-E6.
- Terzian, Yervant. On the Ultraviolet Radiation in the Galaxy, **193**, 93, 63-G10.
- Terzian, Yervant. See Marscher et al., An Optical Atlas of Galactic Supernova Remnants (Erratum to Suppl. 227), **191**, 289, 41-G3.
- Terzian, Yervant, Balick, Bruce, and Bignell, Carl. Radio Synthesis Observations of Planetary Nebulae, **188**, 257, 13-D8.
- Teukolsky, Saul A., and Press, William H. Perturbations of a Rotating Black Hole. III. Interaction of the Hole with Gravitational and Electromagnetic Radiation, **193**, 443, 68-D12.
- Thaddeus, P. See Davis et al., vibrationally Excited Silicon Monoxide in the Orion Nebula, **190**, L117, 37-F13.
- Thaddeus, P. See Green et al., Tentative Identification of U93.174 as the Molecular Ion N₂H⁺, **193**, L89, 69-E6.
- Thaddeus, P. See Shulman et al., Weak Interstellar Lines in the

- Visible Spectrum of Zeta Ophiuchi, **193**, 97, 64-A1.
- Thaddeus, P. See Tucker et al., The Ethynyl Radical C₂H: A New Interstellar Molecule, **193**, L115, 72-F9.
- Thaddeus, P., Mather, J., Davis, J. H., and Blair, G. N. Detection of the $J = 1 \rightarrow 0$ Rotational Transition of vibrationally excited Silicon Monoxide, **192**, L33, 53-C3.
- Thaddeus, Patrick. See Green and Thaddeus, Rotational Excitation of HCN by Collisions, **191**, 653, 47-D13.
- Thomas, H.-C. Apsidal Motion and Period Changes in Centaurus X-3, **191**, L25, 42-C1.
- Thompson, Brian J. See Knox and Thompson, Recovery of Images from Atmospherically Degraded Short-Exposure Photographs, **193**, L45, 66-D1.
- Thompson, D. J., Bignami, G. F., Fichtel, C. E., and Kniffen, D. A. SAS-2 Observations of the High-Energy Gamma Radiation from the Vela Region, **190**, L51, 33-F4.
- Thompson, G. J., Humphries, C. M., and Nandy, K. A Broad Absorption Region in the Ultraviolet Spectra of Early-Type Stars, **187**, L81, 6-D3.
- Thompson, Rodger L., and Johnson, Harold L. A Lower Limit on the ¹²C/¹³C Ratio in Alpha Herculis, **193**, 147, 64-D8.
- Thorne, Kip S. Disk-Accretion onto a Black Hole. II. Evolution of the Hole, **191**, 507, 45-B3.
- Thorne, Kip S. See Page and Thorne, Disk-Accretion onto a Black Hole. I. Time-averaged Structure of Accretion Disk, **191**, 499, 45-A9.
- Thorne, R. M. See Coroniti et al., Stably Trapped Proton Fluxes in the Jovian Magnetosphere, **189**, 383, 24-B13.
- Thuau, T. X. See Kwan and Thuau, The Interpretation of the Interferometric Maps of H₂O Masers near H II Regions, **194**, 293, 77-G2.
- Thuau, T. X. See Ostriker et al., On the Numbers, Birthrates, and Final States of Moderate- and High-Mass Stars, **188**, L87, 18-C14.
- Thuau, T. X., and Ostriker, J. P. Gravitational Radiation from Stellar Collapse, **191**, L105, 49-A6.
- Tifft, W. G. The Definition, Visibility, and Significance of Redshift-Magnitude Bands, **188**, 221, 13-A14.
- Timothy, A. F. See Golub et al., Solar X-Ray Bright Points, **189**, L93, 24-G5.
- Timothy, J. G. See Foukal et al., Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount, **193**, L143, 73-A10.
- Timothy, J. G. See Huber et al., Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from *Skylab*, **194**, L115, 81-B2.
- Timothy, J. G. See Reeves et al., Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount, **188**, L27, 12-D11.
- Tinsley, Beatrice M. Constraints on Models for Chemical Evolution in the Solar Neighborhood, **192**, 629, 59-E1.
- Tinsley, Beatrice M. See Audouze and Tinsley, Galactic Evolution and the Formation of the Light Elements, **192**, 487, 56-E5.
- Tinsley, Beatrice M. See Brown and Tinsley, Galaxy Counts as a Cosmological Test, **194**, 555, 82-B1.
- Tinsley, Beatrice M. See Gott et al., An Unbound Universe?, **194**, 543, 82-A4.
- Tinsley, Beatrice M. See Larson and Tinsley, Photometric Properties of Model Spherical Galaxies, **192**, 293, 54-D11.
- Tinsley, Beatrice M. See Rose and Tinsley, Late Stages of Stellar Evolution in the Light of Elliptical Galaxies, **190**, 243, 31-A4.
- Tinsley, Beatrice M. See Schramm and Tinsley, On the Origin and Evolution of s-Process Elements, **193**, 151, 64-D12.
- Tomasko, Martin G. Ammonia Absorption Relevant to the Albedo of Jupiter. II. Interpretation, **187**, 641, 9-B5.
- Tomkin, J., and Lambert, D. L. The ¹²C/¹³C Ratio in Stellar Atmospheres. III. Alpha Tauri, Beta Geminorum, and Mu Leonis, **193**, 631, 71-C1.
- Tomkin, Jocelyn. See Lambert and Tomkin, The ¹²C/¹³C Ratio in the Atmosphere of the K2 Supergiant Epsilon Pegasi, **194**, L89, 80-G1.
- Toor, A. See Hill et al., A Search for Soft X-Ray Sources in the Galactic Anticenter. Absorption of X-Rays from the Crab Nebula, **187**, 505, 7-F9.
- Toor, A. See Hill et al., An Unusual X-Ray Source in Scutum, **189**, L69, 24-E9.
- Torres-Peimbert, S., Lazcano-Araujo, A., and Peimbert, M. Ionization of the Low-Density Interstellar Medium, **191**, 401, 44-A12.
- Torres-Peimbert, Silvia. See Peimbert and Torres-Peimbert, Chemical Composition of H II Regions in the Large Magellanic Cloud and its Cosmological Implications, **193**, 327, 67-C8.
- Tovmassian, H. M. See Sramek and Tovmassian, Markarian 348: A Variable Radio Source, **191**, L13, 42-A13.
- Tovmassian, H. M. See Sramek and Tovmassian, Radio Emission from Markarian 6, **191**, 633, 47-C11.
- Townes, C. H. See Chui et al., The Methanol Source in Orion at 1.2 Centimeters, **187**, L19, 3-C2.
- Townes, C. H. See Geballe and Townes, Infrared Pumping Processes for SiO Masers, **191**, L37, 42-C10.
- Trafton, L. The Source of Neptune's Internal Heat and the Value of Neptune's Tidal Dissipation Factor, **193**, 477, 68-G5.
- Trafton, L., Parkinson, T., and Macy, W., Jr. The Spatial Extent of Sodium Emission around Io, **190**, L85, 34-A8.
- Trafton, L., and Wildey, R. Jupiter: A Comment on the 8- to 14-Micron Limb Darkening, **194**, 499, 80-B1.
- Trafton, L. M., and Stone, P. H. Radiative-Dynamical Equilibrium States for Jupiter, **188**, 649, 18-A10.
- Trafton, Laurence M. See Murphy and Trafton, Evidence for an Internal Heat Source in Neptune, **193**, 253, 65-D12.
- Trainor, J. H. See McDonald et al., The Anomalous Abundance of Cosmic-Ray Nitrogen and Oxygen Nuclei at Low Energies, **187**, L105, 9-D12.
- Traub, W. A. See Hegyi et al., Cosmic Background Radiation at 1.32 Millimeters, **190**, 543, 35-D8.
- Traub, W. A., Carleton, N. P., and Hegyi, D. J. Search for Deuterium in Orion and Detection of High-Velocity Features, **190**, L81, 34-A4.
- Treffers, Richard, and Cohen, Martin. High-Resolution Spectra of Cool Stars in the 10- and 20-Micron Regions, **188**, 545, 17-A1.
- Troland, T. H., and Heiles, Carl. Observations of H₂CO in the Direction of Cassiopeia A, **194**, 43, 74-D10.
- Troland, Thomas. See Margon et al., A Search for a Cosmological Component of the Soft X-Ray Background in the Direction of M31, **191**, L117, 49-B3.
- Trombka, J. I. See Metzger et al., Observation of a Cosmic Gamma-Ray Burst on *Apollo 16*. I. Temporal Variability and Energy Spectrum, **194**, L19, 76-E2.
- Trombka, J. I., Eller, E. L., Schmadebeck, R. L., Adler, I., Metzger, A. E., Gilman, D., Gorenstein, P., and Bjorkholm, P. Observations of a Cosmic Gamma-Ray Burst on *Apollo 16*. II. X-Ray Time Profile and Source Location, **194**, L27, 76-E2.
- Truran, J. W. See Starrfield et al., CNO Abundances and Hydrodynamic Models of the Nova Outburst. II. 1.00 M_○ Models with Enhanced Carbon and Oxygen, **192**, 817, 61-C13; Suppl. 28, 247 (No. 261).
- Truran, James W. See Starrfield et al., CNO Abundances and Hydrodynamic Models of the Nova Outburst. III. 0.5 M_○ Models with Enhanced Carbon, Oxygen, and Nitrogen, **192**, 647, 59-F5.
- Tsuruta, S. See Lodenquai et al., Photon Opacity in Surfaces of Magnetic Neutron Stars, **190**, 141, 29-D3.
- Tsuruta, S. See Ramaty et al., Scorpius X-1: Origin of the Radio and Hard X-Ray Emissions, **187**, 61, 1-E3.
- Tucker, K. D., Kutner, M. L., and Thaddeus, P. The Ethynyl Radical C₂H: A New Interstellar Molecule, **193**, L115, 72-F9.
- Tucker, Wallace H. See Gorenstein et al., The X-Ray Spectra of the Vela and Puppis Supernova Remnants and the Shock-Wave Model of Supernova Remnants, **192**, 661, 59-G4.
- Tully, R. Brent. The Kinematics and Dynamics of M51. I. The Observations, **192**, 235, 52-B14; Suppl. 27, 415 (No. 251).
- Tully, R. Brent. The Kinematics and Dynamics of M51. II. Axisymmetric Properties, **192**, 235, 52-B14; Suppl. 27, 437 (No. 251).

- Tully, R. Brent. The Kinematics and Dynamics of M51. III. The Spiral Structure, **192**, 235, 52-B14; Suppl. **27**, 449 (No. 251).
- Tuohy, I. R. See Rapley and Tuohy, X-Ray Observations of the Large Magellanic Cloud by the *Copernicus* Satellite, **191**, L113, 49-A13.
- Turner, B. E. Detection of OH at 18-Centimeter Wavelength in Comet Kohoutek (1973f), **189**, L137, 27-E9.
- Turner, B. E. U93.174: A New Interstellar Line with Quadrupole Hyperfine Splitting, **193**, L83, 69-E1.
- Turner, B. E. See Morris et al., Millimeter-Wavelength Molecular Lines and Far-Infrared Sources, **191**, 349, 43-E4.
- Turner, B. E. See Morris et al., The New Molecular Cloud in Orion, **192**, L27, 53-B11.
- Turner, B. E., Balick, Bruce, Cudaback, D. D., Heiles, Carl, and Boyle, Robert J. Fine Structure in H II Regions. II, **194**, 279, 77-F1.
- Turner, B. E., and Heiles, C. E. On the Relationship of OH and Formaldehyde with Interstellar Extinction, **194**, 525, 80-C11.
- Turner, B. E., and Zuckerman, B. Microwave Detection of Interstellar CH, **187**, L59, 6-B11.
- Turner, Edwin L., and Sargent, Wallace L. W. The Nature of Small Groups of Galaxies in the Local Supercluster, **194**, 587, 82-D13.
- Ulmer, M. P. See Baity et al., Extended Observations of >7-keV X-Rays from Centaurus X-3 by the OSO-7 Satellite, **187**, 341, 5-B9.
- Ulmer, M. P., Baity, W. A., Wheaton, Wm. A., and Peterson, L. E. 4.8-Second Pulsed X-Rays from Centaurus X-3 at Energy Greater than 7 keV, **191**, 593, 46-A1.
- Ulmer, M. P., Baity, W. A., Wheaton, Wm. A., and Peterson, L. E. Observations of the 4.8-Hour Variations of Cygnus X-3 above 7 keV from the OSO-7, **192**, 691, 60-B4.
- Ulmer, M. P., Baity, W. A., Wheaton, Wm. A., and Peterson, L. E. Upper Limit to the X-Ray Flux from the Supernova in NGC 5253 above 7 keV from the OSO-7, **193**, 535, 70-C6.
- Ulmer, M. P., Sammuli, A., Baity, W. A., Wheaton, Wm. A., and Peterson, L. E. Long-Term Observations of Cygnus X-2 from OSO-7, **189**, 339, 23-F9.
- Ulrich, Roger K. Solar Models with Low Neutrino Fluxes, **188**, 369, 14-E4.
- Ulrich, Roger K. Studies of Evolved Stars. III. Models of FG Sagittae Consistent with s-Process Nucleosynthesis, **192**, 507, 56-F10.
- Ulrych, Tad J. See Richer and Ulrych, High-Frequency Optical Variables. II. Luminosity-variable White Dwarfs and Maximum Entropy Spectral Analysis, **192**, 719, 60-D2.
- Underhill, Anne B. The Ultraviolet Spectrum of Eta Canis Majoris, B5 Ia, **191**, 601, 46-A6; Suppl. **27**, 359 (No. 249).
- Upgren, A. R. The Distance to the Hyades Cluster from R-I Photometry, **193**, 359, 67-E9.
- Vaiana, G. S. See Golub et al., Solar X-Ray Bright Points, **189**, L93, 24-G5.
- Vallee, Jacques P., and Kronberg, Philipp P. Observations at Wavelengths of 2.2 and 4.5 Centimeters of the Linear Polarization of Radio Galaxies and Quasars, **193**, 303, 67-A13.
- Valley, George C. Scattering of Alfvén Waves by Random Density Fluctuations, **188**, 181, 11-G4.
- Valtonen, Mauri J. See Saslaw et al., The Gravitational Slingshot and the Structure of Extragalactic Radio Sources, **190**, 253, 31-A13.
- Van, Y. Y. See Manchester et al., Detection of Pulsar Proper Motion, **189**, L119, 27-D6.
- Van Biesbroeck, G. Micrometric Measures of Double Stars, **194**, 541, 80-D11; Suppl. **28**, 413 (No. 270).
- van den Bergh, Sidney. Dark Nebulae in the Magellanic Clouds, **193**, 63, 63-E9.
- van den Bergh, Sidney. The Dwarf Spheroidal Companions to the Andromeda Nebula, **191**, 271, 41-E13.
- van den Bergh, Sidney. Tentative Identification of Main-Sequence Stars in the Nuclear Bulge of the Galaxy, **188**, L9, 12-C10.
- van den Bergh, Sidney. See Hagen and van den Bergh, Differences between the Evolutionary Tracks of Young Stars in the Galaxy and in the Magellanic Clouds, **189**, L103, 27-C5.
- van den Bergh, Sidney. See Madore et al., Gas Density and the Rate of Star Formation in M33, **191**, 317, 43-C2.
- van den Bergh, Sidney, Marscher, Alan P., and Terzian, Yervant. An Optical Atlas of Galactic Supernova Remnants (Erratum to Suppl. **227**), **191**, 289, 41-G3.
- Vanden Bout, P. A. See Moffett et al., Nonperiodic Optical Flickering in HZ Herculis, **190**, L63, 33-G1.
- Vanden Bout, Paul A. See Loren et al., Collapsing Molecular Clouds?, **194**, L103, 81-A1.
- Vanden Bout, Paul A., and Grupsmith, Gerald. Detection of Interstellar Lithium in the Direction of 55 Cygni, **187**, L9, 3-B8.
- van der Kruit, P. C. The Motions in the Central Region of NGC 4736: Evidence for an Expanding Ring, **188**, 3, 10-A6.
- van der Kruit, P. C. The Velocity Field of NGC 4258, **192**, 1, 50-A4.
- Van Hise, James R. Light Decay Curve of the Supernova in IC 4182, **192**, 657, 59-G1.
- Van Horn, H. M. See Fontaine et al., The Effects of Differences in Composition, Equation of State, and Mixing Length upon the Structure of White-Dwarf Convection Zones, **193**, 205, 65-A9.
- Van Horn, H. M. See Sofia and Van Horn, The Origin of the Cosmic Gamma-Ray Bursts, **194**, 593, 82-E5.
- Van Horn, H. M., and Hansen, C. J. A Model for the Transient X-Ray Sources, **191**, 479, 44-G4.
- Van Till, H. See Davis et al., vibrationally Excited Silicon Monoxide in the Orion Nebula, **190**, L117, 37-F13.
- Varshni, Y. P. Chance Coincidences in the Absorption-Line Spectrum of 4C 05.34, **193**, L5, 66-A6.
- Vedrenne, G. See Bui-Van et al., High-Energy X-Rays from the Perseus Cluster, **188**, 217, 13-A11.
- Veeder, Glenn J. The Local Mass Density, **191**, L57, 46-B1.
- Vernazza, J. E. See Foukal et al., Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount, **193**, L143, 73-A10.
- Vernazza, J. E. See Huber et al., Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from *Skylab*, **194**, L115, 81-B2.
- Vernazza, J. E. See Reeves et al., Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount, **188**, L27, 12-D11.
- Verschuur, G. L. Studies of Neutral Hydrogen Cloud Structure, **188**, 669, 18-B13; Suppl. **27**, 65 (No. 238).
- Verschuur, G. L. Studies of Neutral Hydrogen Cloud Structure in the Vicinity of the North Polar Spur, **191**, 288, 41-G2; Suppl. **27**, 283 (No. 245).
- Vespignani, G. R. See Palumbo et al., Observation of a Celestial Hard X-Ray Burst in Coincidence with a Gamma-Ray Burst, **189**, L9, 20-G8.
- Vereverka, J. See Elliot et al., The Occultation of Beta Scorpii by Jupiter. II. The Hydrogen-Helium Abundance in the Jovian Atmosphere, **190**, 719, 37-C6.
- Vereverka, J. See Noland et al., New Evidence for the Variability of Titan, **194**, L157, 84-G2.
- Vereverka, J., Wasserman, L., and Sagan, Carl. On the Upper Atmosphere of Neptune, **189**, 569, 26-F7.
- Victor, G. A. See Laughlin and Victor, Multiplet Splittings and $^1S_0 - ^3P_1$ Intercombination-Line Oscillator Strengths in Be I and Mg I, **192**, 551, 57-B12.
- Vidal, N. V. See Bessell et al., 2U 1700-37: Another Black Hole?, **187**, 355, 5-C10.
- Vidal, N. V. See Wickramasinghe et al., 2U 0900-40: A Black Hole?, **188**, 167, 11-F4.
- Vidal, N. V., Wickramasinghe, D. T., Peterson, B. A., and Bessell, M. S. Photoelectric and Spectroscopic Observations of WRA 795, **188**, 163, 11-E13.
- Vidal, N. V., Wickramasinghe, D. T., Peterson, B. A., and Bessell, M. S. Spectroscopic Studies of a Suggested Optical Can-

- dicate for Centaurus X-3, **191**, L23, 42-B11.
- Viotti, R. See Baratta et al., On the Problem of V1016 Cygni and the Evolutionary Stage of the Symbiotic Stars, **187**, 651, 9-C1.
- Visvanathan, Natarajan. Comparison of the Optical Spectrum of the Filaments with the Spectrum of the Central Region of M82, **192**, 319, 54-F11.
- Vlieks, A. E., Morgan, J. F., and Blatt, S. L. Reaction Rates of Interest in Late Stages of Stellar Nucleosynthesis, **191**, 699, 48-A1.
- Vogt, R. E. See Hurford et al., The Energy Spectrum of 0.16 to 2 MeV Electrons during Solar Quiet Times, **192**, 541, 57-B2.
- Vorpahl, Joan A., and Takakura, Tatsuo. Rise Time in 20-32 keV Impulsive X-Radiation, **191**, 563, 45-E13.
- Waak, J. A., and Mayer, C. H. The H₂O Source in Sagittarius B2, **189**, 67, 19-F1.
- Wade, Clarence. See Kastner and Wade, Dipole and Quadrupole Integrals for the C I, N I, and O I Sequences, **190**, 745, 37-E2; Suppl. **27**, 247 (No. 243).
- Wagner, Raymond L. Theoretical Evolution of Extremely Metal-poor Stars, **191**, 173, 40-F5.
- Wagoner, Robert V., and Malone, Robert C. Post-Newtonian Neutron Stars, **189**, L75, 24-F3.
- Wampler, E. J. See Baldwin et al., An Analysis of the Spectrum of the Large-Redshift Quasi-stellar Object OQ 172, **193**, 513, 70-A11.
- Walborn, Nolan R. A New Phenomenon in the Spectrum of Sigma Orionis E, **191**, L95, 46-D9.
- Walborn, Nolan R. Some Morphological Properties of WN Spectra, **189**, 269, 23-A11.
- Wald, Robert M. Energy Limits on the Penrose Process, **191**, 231, 41-C2.
- Walker, A. B. C., Jr., Rugge, H. R., and Weiss, Kay. Relative Coronal Abundances Derived from X-Ray Observations. I. Sodium, Magnesium, Aluminum, Silicon, Sulfur, and Argon, **188**, 423, 15-B9.
- Walker, A. B. C., Jr., Rugge, H. R., and Weiss, Kay. Relative Coronal Abundances Derived from X-Ray Observations. II. Nitrogen, Oxygen, Neon, Magnesium, and Iron, **192**, 169, 51-E5.
- Walker, A. B. C., Jr., Rugge, H. R., and Weiss, Kay. Relative Coronal Abundances Derived from X-Ray Observations. III. The Effect of Cascades on the Relative Intensity of Fe xvii Line Fluxes, and a Revised Iron Abundance, **194**, 471, 79-F5.
- Walker, G. A. H. See Hutchings et al., H_α Emission in Cygnus X-1, **191**, 743, 48-D4.
- Walker, Merle F., Pike, C. D., and McGee, J. D. Direct Electronographic Observations of Luminous Connections between Galaxies with Discordant Redshifts, **194**, L125, 84-D8.
- Wallace, L. See Chamberlain and Wallace, Formation of Coupled Spectral Lines in a Planetary Atmosphere, **190**, 487, 33-D7.
- Wallace, L., Prather, Michael, and Belton, Michael J. S. The Thermal Structure of the Atmosphere of Jupiter, **193**, 481, 68-G9.
- Wallerstein, G. See Böhm-Vitense et al., Masses and Luminosities of Population II Cepheids, **194**, 125, 75-C6.
- Wallerstein, George. High-Dispersion Spectroscopic Observations of HD 77581, a Candidate for Vela XR-1 (2U 0900-40), **194**, 451, 79-D14.
- Wallerstein, George. See Cohen and Wallerstein, On the Velocity Structure of the Interstellar Clouds near Rho Ophiuchi, **189**, 259, 22-G9.
- Wallerstein, George. See Mikkelsen and Wallerstein, Limitations on the Masses and Other Dimensions of the Binary HD 77581, **194**, 459, 79-E9.
- Wallerstein, George, and Goldsmith, Donald. The Interstellar Abundance of Titanium, **187**, 237, 4-B9.
- Wannier, P. G. See Linke and Wannier, Kinematics of the Orion A Molecular Cloud, **193**, L41, 66-C11.
- Wannier, P. G. See Liszt et al., CO and CS in the Orion Nebula, **190**, 557, 35-E8.
- Wannier, P. G. See Phillips et al., Large-Scale Wave Structure in the Orion Molecular Cloud, **191**, L31, 42-C5.
- Wannier, P. G. See Phillips et al., A New DCN Line: DCN(HCN) Excitation, **192**, L153, 62-A5.
- Wannier, P. G., Encrenaz, P. J., Wilson, R. W., and Penzias, A. A. Isotopic Abundances and Line Formation in the Orion Nebula, **190**, L77, 34-A1.
- Ward, Richard A. See Clayton and Ward, *s*-Process Studies: Exact Evaluation of an Exponential Distribution of Exposures, **193**, 397, 68-A5.
- Wardle, J. F. C., and Kronberg, P. P. The Linear Polarization of Quasi-stellar Radio Sources at 3.71 and 11.1 Centimeters, **194**, 249, 77-C14.
- Wardle, J. F. C., and Sramek, R. A. The Polarization of Normal Galaxies at Radio Wavelengths, **189**, 399, 25-A4.
- Warner, John W. On the Stellar Content and Reddening in the Nucleus of NGC 5195, **190**, 19, 28-B7.
- Warner, John W. Physical Conditions in the Nuclei of M51, M81, and M64 (Erratum), **192**, 819, 61-C14.
- Warnock, W. W. See Mutel et al., VLBI Observations of the Crab Nebula and the Wavelength Dependence of Interstellar Scattering, **193**, 279, 65-F9.
- Warnock, W. W. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, **193**, 293, 67-A4.
- Wasserman, Ira. See Brecher and Wasserman, On Changes in the Pulsation Period of Hercules X-1, **192**, L125, 61-F7.
- Wasserman, L. See Veverka et al., On the Upper Atmosphere of Neptune, **189**, 569, 26-F7.
- Wasserman, L. H. See Elliot et al., The Occultation of Beta Scorpii by Jupiter. II. The Hydrogen-Helium Abundance in the Jovian Atmosphere, **190**, 719, 37-C6.
- Watson, William D. Ion-Molecule Reactions, Molecule Formation, and Hydrogen-Isotope Exchange in Dense Interstellar Clouds, **188**, 35, 10-C7.
- Watson, William D. Molecular CH, CH⁺, and H₂ in the Interstellar Gas, **189**, 221, 22-D12; Erratum, **191**, 797, 48-G11.
- Watson, William D. See O'Donnell and Watson, Upper Limits to the Flux of Cosmic Rays and X-Rays in Interstellar Clouds, **191**, 89, 40-A1.
- Weaver, T. A., and Chapline, G. F. Dissipation in Supernova Shock Waves, **192**, L57, 57-E6.
- Weaver, Wm. Bruce. The Coalsack. II. Photometry of Suspected Flare Stars, **189**, 81, 19-G1.
- Weaver, Wm. Bruce. The Coalsack. III. A Search for T Tauri Stars, **189**, 263, 22-G12.
- Webber, W. R. See McDonald et al., The Anomalous Abundance of Cosmic-Ray Nitrogen and Oxygen Nuclei at Low Energies, **187**, L105, 9-D12.
- Weedman, D. W. See Khachikian and Weedman, A Blue Galactic Nucleus with Featureless Spectrum, **189**, L99, 27-C1.
- Weedman, D. W., and Carswell, R. F. The Starlike Nucleus of NGC 6207, **188**, 1, 10-A4.
- Weedman, Daniel W. See Khachikian and Weedman, An Atlas of Seyfert Galaxies, **192**, 581, 59-A7.
- Weedman, Daniel W. See Osmer et al., The Nuclei of Peculiar Emission-Line Galaxies, **192**, 279, 54-C12.
- Weedman, Daniel W. See Osmer et al., The Southern Seyfert Galaxies NGC 1566 and NGC 3783, **189**, 187, 22-B8.
- Wehinger, P., and Wyckoff, S. H₂O⁺ in Spectra of Comet Bradford (1974b), **192**, L41, 53-C10.
- Wehinger, P. A., Wyckoff, S., Herbig, G. H., Herzberg, G., and Lew, H. Identification of H₂O⁺ in the Tail of Comet Kohoutek (1973), **190**, L43, 30-G6.
- Wehlau, William H. See Falk and Wehlau, Harmonic Analysis of the Line Profiles of an Oblique Rotator, **192**, 409, 55-F13.
- Weis, Edward W. On the Inclination of Rotation Axes in Visual Binaries, **190**, 331, 31-G8.
- Weisheit, Jon C. On Detecting Cold, Low-Density Interstellar Gas, **190**, L121, 37-G2.
- Weisheit, Jon C. X-Ray Ionization Cross-Sections and Ionization Equilibrium Equations Modified by Auger Transitions, **190**, 735, 37-D7.

- Weisheit, Jon C., and Shore, Bruce W. Plasma-screening Effects upon Atomic Hydrogen Photoabsorption, **194**, 519, 80-C6.
- Weisheit, Jon C., and Tarter, C. Bruce. Implications of the *Copernicus* Observations of Unreddened Stars (Erratum), **188**, L77, 15-F13.
- Weiss, Kay. See Walker et al., Relative Coronal Abundances Derived from X-Ray Observations. I. Sodium, Magnesium, Aluminum, Silicon, Sulfur, and Argon, **188**, 423, 15-B9.
- Weiss, Kay. See Walker et al., Relative Coronal Abundances Derived from X-Ray Observations. II. Nitrogen, Oxygen, Neon, Magnesium, and Iron, **192**, 169, 51-E5.
- Weiss, Kay. See Walker et al., Relative Coronal Abundances Derived from X-Ray Observations. III. The Effect of Cascades on the Relative Intensity of Fe XVII Line Fluxes, and a Revised Iron Abundance, **194**, 471, 79-F5.
- Weisskopf, M. C. See Wolff et al., X-Ray Morphology of the Perseus Cluster, **193**, L53, 69-B11.
- Weisskopf, M. C., Helava, H., and Wolff, R. S. An Upper Limit to an X-Ray Point Source at the Center of the Cygnus Loop, **194**, L71, 80-E10.
- Welch, William. See Davidsen and Welch, Limits on Ionized Intracluster Gas in Abell 2199, **191**, L11, 42-A11.
- Weliachew, L. A Study of the H I Absorption in the Galaxy M82 by Radio Interferometry, **191**, 639, 47-D2.
- Weller, C. S., and Meier, R. R. Observations of Helium in the Interplanetary/Interstellar Wind: The Solar-Wake Effect, **193**, 471, 68-F13.
- Weller, W. See Sanyal et al., Short-Term Spectral Variability of γ^2 Velorum. Photometric Observations, **187**, L31, 3-D1.
- Werner, W. M. See Harvey et al., Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission, **189**, L87, 24-F13.
- Werner, M. W. See Wynn-Williams et al., Accurate Positions of OH Sources, **187**, 41, 1-C10.
- Werner, M. W., Elias, J. H., Gezari, D. Y., and Westbrook, W. E. 1-Millimeter Continuum Radiation from Orion Molecular Cloud 2, **192**, L31, 53-C1.
- Westbrook, W. E. See Werner et al., 1-Millimeter Continuum Radiation from Orion Molecular Cloud 2, **192**, L31, 53-C1.
- Westphal, J. A., Matthews, Keith, and Terrile, Richard J. Five-Micron Pictures of Jupiter, **188**, L111, 18-E6.
- Wheaton, W. A. See Baity et al., Extended Observations of >7-keV X-Rays from Centaurus X-3 by the OSO-7 Satellite, **187**, 341, 5-B9.
- Wheaton, Wm. A. See Ulmer et al., 4.8-Second Pulsed X-Rays from Centaurus X-3 at Energy Greater than 7 keV, **191**, 593, 46-A1.
- Wheaton, Wm. A. See Ulmer et al., Long-Term Observations of Cygnus X-2 from OSO-7, **189**, 339, 23-F9.
- Wheaton, Wm. A. See Ulmer et al., Observations of the 4.8-Hour Variations of Cygnus X-3 above 7 keV from the OSO-7, **192**, 691, 60-B4.
- Wheaton, Wm. A. See Ulmer et al., Upper Limit to the X-Ray Flux from the Supernova NGC 5253 above 7 keV from the OSO-7, **193**, 535, 70-C6.
- Wheeler, J. Craig. Type I Supernovae, **187**, 337, 5-B5.
- Wheeler, J. Craig, McKee, C. F., and Lecar, M. Neutron Stars in Close Binary Systems, **192**, L71, 57-F4.
- Whelan, John. See Hintzen et al., Are All Blue Stragglers Close Binaries?, **194**, 657, 83-C2.
- Whelan, John A. J. See Grandi et al., The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis, **190**, 365, 32-C1.
- White, Richard E. Depletion of Interstellar Sodium and Calcium, **187**, 449, 7-B13.
- Whiting, Ellis E., and Nicholls, Ralph W. Reinvestigation of Rotational-Line Intensity Factors in Diatomic Spectra, **187**, 661, 9-C10; Suppl. 27, 1 (No. 235).
- Whitlock, R. R. See Feldman et al., Satellite Line Spectra from Laser-produced Plasmas, **192**, 213, 52-A6.
- Whitney, A. R. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, **193**, 293, 67-A4.
- Wickramasinghe, D. T. See Bessell et al., 2U 1700-37: Another Black Hole?, **187**, 355, 5-C10.
- Wickramasinghe, D. T. See Vidal et al., Photoelectric and Spectroscopic Observations of WRA 795, **188**, 163, 11-E13.
- Wickramasinghe, D. T. See Vidal et al., Spectroscopic Studies of a Suggested Optical Candidate for Centaurus X-3, **191**, L23, 42-B11.
- Wickramasinghe, D. T., Vidal, N. V., Bessell, M. S., Peterson, B. A., and Perry, M. E. 2U 0900-40: A Black Hole?, **188**, 167, 11-F4.
- Widing, Kenneth G., and Cheng, Chung-Chieh. On the Fe XXIV Emission in the Solar Flare of 1973 June 15, **194**, L111, 81-A8.
- Wildey, R. See Trafton and Wildey, Jupiter: A Comment on the 8- to 14-Micron Limb Darkening, **194**, 499, 80-B1.
- Wilkinson, David T. See Davis and Wilkinson, Search for Primeval Galaxies, **192**, 251, 54-A13.
- Will, Clifford M. On the Stability of Axisymmetric Systems to Axisymmetric Perturbation in General Relativity. V. Differentially Rotating Configurations, **190**, 403, 32-E8.
- Will, Clifford M. Perturbations of a Slowly Rotating Black Hole by a Stationary Axisymmetric Ring of Matter. I. Equilibrium Configurations, **191**, 521, 45-C2.
- Williams, R. E. See Carswell et al., Optical Observations of the Radio Source 0735+178, **190**, L101, 37-E11.
- Williams, W. L. See Brown et al., Further Observations for Circularly Polarized Radiation from White Dwarfs and X-Ray Sources, **191**, L111, 49-A11.
- Williams, W. L. See Rich and Williams, Observations for Broad-Band Circular Polarization in White Dwarfs and Nuclei of Planetary Nebulae, **190**, 117, 29-B8.
- Williamson, F. O., Sanders, W. T., Kraushaar, W. L., McCammon, D., Borken, R., and Bunner, A. N. Observations of Features in the Soft X-Ray Background Flux, **193**, L133, 73-A1.
- Wills, Beverley J. See Wills and Wills, Spectroscopy of Objects near Texas Radio-Source Positions, **190**, 271, 31-C3.
- Wills, Beverley J., and Wills, 3C 66A: A Bright New Quasi-stellar Object, **190**, L97, 37-E6.
- Wills, D. See Wills and Wills, 3C 66A: A Bright New Quasi-stellar Object, **190**, L97, 37-E6.
- Wills, D., and Wills, Beverley J. Spectroscopy of Objects near Texas Radio-Source Positions, **190**, 271, 31-C3.
- Willson, L. A. Fe I Fluorescence in T Tauri Stars, **191**, 143, 40-D4.
- Wilson, James R. See Alme and Wilson, Numerical Study of X-Ray Induced Mass Transfer in the HZ Herculis-Hercules X-1 Binary System, **194**, 147, 75-E1.
- Wilson, Lance W. Analytical Variational Calculation of the Ground-State Binding Energy of Hydrogen in Intermediate and Intense Magnetic Fields, **188**, 349, 14-C12.
- Wilson, R. W. See Liszt et al., CO and CS in the Orion Nebula, **190**, 557, 35-E8.
- Wilson, R. W. See Wannier et al., Isotopic Abundances and Line Formation in the Orion Nebula, **190**, L77, 34-A1.
- Wilson, Robert E. The Secondary Component of Beta Lyrae, **189**, 319, 23-E4.
- Wilson, T. L. See Downes and Wilson, Formaldehyde Line Emission at 4.8 GHz near NGC 7538, **191**, L77, 46-C5.
- Wilson, W. J. See Wynn-Williams et al., Accurate Positions of OH Sources, **187**, 41, 1-C10.
- Wilson, W. J., Schwartz, P. R., Epstein, E. E., Johnson, W. A., Etcheverry, R. D., Mori, T. T., Berry, G. G., and Dyson, H. B. Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters, **191**, 357, 43-E11.
- Wilson, William J. See Harvey et al., Time Variation in the OH Microwave and Infrared Emission from Late-Type Stars, **191**, 599, 46-A5; Suppl. 27, 331 (No. 248).
- Windsor, R. A., and Kellogg, P. J. Polarization of Inverse Plasmon Scattering, **190**, 167, 29-E14.
- Winkler, P. Frank, Jr., and Clark, George W. X-Ray Observations of the Supernova Remnant IC 443, **191**, L67, 46-B9.
- Winnberg, A. See Johansson et al., OH Observations near the

- Reflection Nebulae NGC 2068 and NGC 2071, **189**, 455, 25-E6.
- Winnewisser, G. See Hocking et al., The Dipole Moment of Isocyanic Acid, HNCO, and Its Astrophysical Consequences, **187**, L89, 6-D13.
- Withbroe, G. L. See Foukal et al., Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount, **193**, L143, 73-A10.
- Withbroe, G. L. See Huber et al., Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from *Skylab*, **194**, L115, 81-B2.
- Withbroe, G. L. See Reeves et al., Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount, **188**, L27, 12-D11.
- Wittels, J. J. See Rogers et al., The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers, **193**, 293, 67-A4.
- Witten, T. A., Jr. Compounds in Neutron-Star Crusts, **188**, 615, 17-F5.
- Wolfe, Arthur M. On the Steady Flow of Gas from the Nuclei of Seyfert Galaxies, **188**, 243, 13-C8; Addendum, **188**, 441, 15-C14.
- Wolff, Charles L. Distinctive Patterns on the Surface of Slowly Rotating Stars Whose Oscillations Are Nonlinearly Coupled, **193**, 721, 72-B7.
- Wolff, Charles L. Rigid and Differential Rotation Driven by Oscillations within the Sun, **194**, 489, 80-A2.
- Wolff, R. S. See Weisskopf et al., An Upper Limit to an X-Ray Point Source at the Center of the Cygnus Loop, **194**, L71, 80-E10.
- Wolff, R. S., Helava, H., Kifune, T., and Weisskopf, M. C. X-Ray Morphology of the Perseus Cluster, **193**, L53, 69-B11.
- Wolff, Richard J. See Wolff and Wolff, The Manganese Stars, **194**, 65, 74-F3.
- Wolff, Sidney C. See Bonsack et al., The Variations of the Magnetic Ap Star 49 Camelopardalis, **187**, 265, 4-D7.
- Wolff, Sidney C. See Jones et al., The Holmium Ap Star HD 51418, **190**, 579, 35-G2.
- Wolff, Sidney C., and Morrison, Nancy D. Spectroscopic Observations of HD 153919 (2U 1700-37), **187**, 69, 1-E11.
- Wolff, Sidney C., Pilachowski, Catherine A., and Wolstencroft, Ramon D. BD+37°1977: A Very Hot Subdwarf, **194**, L83, 80-F9.
- Wolff, Sidney C., and Wolff, Richard J. The Manganese Stars, **194**, 65, 74-F3.
- Wolffman, E. R. See Rank et al., Detection of ^{17}O in IRC+10216, **187**, L111, 9-E3.
- Wolnik, S. J. See Fairbairn et al., Oscillator Strengths in the Ti O Alpha-Band System, **193**, 273, 65-F3.
- Wolstencroft, Ramon D. See Kemp et al., DQ Herculis: Periodic Linear Polarization Synchronous with the Rapid Light Variations, **193**, L15, 66-B1.
- Wolstencroft, Ramon D. See Kemp et al., On the Linear Polarization of GD-229, **189**, L79, 24-F6.
- Wolstencroft, Ramon D. See Swedlund et al., Discovery of Time-Varying Circular and Linear Polarization in the White-Dwarf Suspect GD 229, **187**, L121, 9-E12.
- Wolstencroft, Ramon D. See Swedlund et al., DQ Herculis: Periodic Circular Polarization Synchronous with the Rapid Light Variations, **193**, L11, 66-A12.
- Wolstencroft, Ramon D. See Wolff et al., BD+37°1977: A Very Hot Subdwarf, **194**, L83, 80-F9.
- Wong, Cheuk-Yin. Toroidal Figures of Equilibrium, **190**, 675, 36-G6.
- Wood, P. R. Models of Asymptotic-Giant-Branch Stars, **190**, 609, 36-B1.
- Woodgate, B. E., Stockman, H. S., Jr., Angel, J. R. P., and Kirshner, R. P. Detection of the [Fe xiv] Coronal Line at 5303 Å in the Cygnus Loop, **188**, L79, 18-C6.
- Woodman, Jerry H. See Owen et al., On the Identification of the 6420 Å Absorption Feature in the Spectra of Uranus and Neptune, **189**, 379, 24-B10.
- Woodsworth, A. See Hughes et al., Daily Observations of Cygnus X-3 at 10.5 GHz during the Period 1973 July–October, **191**, 749, 48-D10.
- Woolf, N. J. See Jameson et al., Infrared Emission by Dust in NGC 1068 and Three Planetary Nebulae, **190**, 353, 32-B2.
- Woolf, N. J. See Jameson et al., Infrared Spectra of NGC 1068, **187**, L109, 9-E2.
- Woosley, S. E. See Hainbach et al., On the e -Process: Its Components and their Neutron Excesses, **193**, 157, 64-E3.
- Worden, Simon P. See Grandi et al., The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis, **190**, 365, 32-C1.
- Worth, Michael D., and Heintz, Wulf D. Parallax, Orbit, and Mass of the Binary Star 70 Ophiuchi, **193**, 647, 71-D1.
- Wright, E. L. See Fazio et al., A High-Resolution Map of the Orion Nebula Region at Far-Infrared Wavelengths, **192**, L23, 53-B8.
- Wright, E. L. See Grindlay et al., Search for Optical Emission from Cosmic Gamma-Ray Bursts, **192**, L113, 61-E6.
- Wright, E. L. See Jura and Wright, Helium Abundance at the Galactic Center, **188**, 473, 16-C2; Erratum, **193**, 291, 65-G7.
- Wright, E. L. See Kleinmann and Wright, 10-Micron Observations of Southern-Hemisphere Galaxies, **191**, L19, 42-B5.
- Wright, M. C. H. See Rogstad et al., Aperture-Synthesis Observations of H I in the Galaxy M83, **193**, 309, 67-B7.
- Wu, C.-S. See Smith and Wu, Implications of the *Pioneer 10* Measurements of the Jovian Magnetic Field for Theories of Io-modulated Decametric Radiation, **190**, L91, 34-A13; Addendum, **193**, L101, 69-F2.
- Wyckoff, S. See Wehinger and Wyckoff, H₂O⁺ in Spectra of Comet Bradfield (1974b), **192**, L41, 53-C10.
- Wyckoff, S. See Wehinger et al., Identification of H₂O⁺ in the Tail of Comet Kohoutek (1973), **190**, L43, 30-G6.
- Wynn-Williams, C. G. See Becklin et al., Infrared Emission from the Southern H II Region H2-3, **187**, 487, 7-E6.
- Wynn-Williams, C. G. See Becklin et al., The H II Region G333.6-0.6, a Very Powerful 1–20 Micron Source (Erratum), **193**, L153, 73-B7.
- Wynn-Williams, C. G. See Becklin et al., Infrared, Radio, and X-Ray Observations of Cygnus X-3, **192**, L119, 61-E11.
- Wynn-Williams, C. G., Becklin, E. E., and Neugebauer, G. Infrared Studies of H II Regions and OH Sources, **187**, 473, 7-D8.
- Wynn-Williams, C. G., Werner, M. W., and Wilson, W. J. Accurate Positions of OH Sources, **187**, 41, 1-C10.
- Yahil, A. See Ostriker et al., The Size and Mass of Galaxies, and the Mass of the Universe, **193**, L1, 66-A2.
- Yahil, Amos. The Density Profiles of Rich Clusters of Galaxies, **191**, 623, 47-C1.
- Yamashita, K. See de Korte et al., Observation of Enhanced Soft X-Ray Emission from the Vicinity of the North Polar Spur, **190**, L5, 30-D7.
- Yerbury, M. J. See Condon et al., Interpretation of Saturn's Decimetric Radio Emission, **193**, 257, 65-E1.
- York, Donald G. Highly Ionized Atoms Observed with *Copernicus*, **193**, L127, 72-G6.
- York, Donald G. See Jenkins et al., Rocket-Ultraviolet Spectra of Kappa, Lambda, Tau, and Upsilon Scorpii, **194**, 77, 74-G1.
- Young, A. T. Seeing: Its Cause and Cure, **189**, 587, 26-G11.
- Yu, G. The Interstellar Wake of the Solar Wind, **194**, 187, 75-G13.
- Yung, Yuk Ling. See McElroy et al., Sodium Emission from Io: Implications, **187**, L127, 9-F3.
- Zaidins, C. S. See Roughton et al., Stellar Reaction Rates for Proton Capture on ^{28}Si , ^{50}Cr , ^{54}Fe , ^{58}Ni , ^{60}Ni , and ^{61}Ni , **193**, 187, 64-G7.
- Zaidins, C. S. See Roughton et al., Thick-Target Measurement of the (p, γ) Stellar Reaction Rates of the Nuclides ^{12}C , ^{28}Si , ^{48}Ti , ^{47}Ti , and ^{56}Fe , **188**, 595, 17-D10.
- Zappala, R. R. On the Nature of BD-10°4662, **187**, 257, 4-D1.
- Zappala, R. R. See Brucato and Zappala, Observations of Hα in

- HDE 226868, **189**, L71, 24-E11.
- Zappala, R. R., Becklin, E. E., Matthews, K., and Neugebauer, G. Angular Diameter of IRC+10011 at 2.2, 10, and 20 Microns, **192**, 109, 51-A8.
- Zarnecki, J. C. See Fabian et al., *Copernicus* X-Ray Observations of NGC 1275 and the Core of the Perseus Cluster, **189**, L59, 24-E1.
- Zaumen, W. T. See Catura et al., The Extended X-Ray Source in Virgo and its Relation to M87, **190**, 521, 35-B1.
- Zeilik, M., II. See Fazio et al., A High-Resolution Map of the Orion Nebula Region at Far-Infrared Wavelengths, **192**, L23, 53-B8.
- Zimmerman, Barbara A. See Howard et al., Measurement and Theoretical Analysis of Some Reaction Rates of Interest in Silicon Burning, **188**, 131, 11-C13.
- Zinn, Robert. Advanced Evolution in Globular Clusters. I. The Ultraviolet-Bright Stars in Eight Globular Clusters. I. The Ultraviolet-Bright Stars in Eight Globular Clusters, **193**, 593, 70-G5.
- Zuckerman, B. See Harvey et al., Dust and Gas in the Orion Molecular Cloud; Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission, **189**, L87, 24-F13.
- Zuckerman, B. See Morris et al., Millimeter-Wavelength Molecular Lines and Far-Infrared Sources, **191**, 349, 43-E4.
- Zuckerman, B. See Morris et al., The New Molecular Cloud in Orion, **192**, L27, 53-B11.
- Zuckerman, B. See Turner and Zuckerman, Microwave Detection of Interstellar CH, **187**, L59, 6-B11.
- Zuckerman, B., and Ball, John A. On Microwave Recombination Lines from H I Regions, **190**, 35, 28-C9.
- Zuckerman, B., Buhl, D., Palmer, Patrick, and Snyder, L. E. ¹²C/¹³C Abundance Ratios from Observations of Interstellar H₂¹³C¹⁸O, **189**, 217, 22-D7.
- Zuckerman, B., and Evans, N. J., II. Models of Massive Molecular Clouds, **192**, L149, 62-A1.
- Zweibel, Ellen Gould. See Spitzer and Zweibel, On the Theory of H₂ Rotational Excitation, **191**, L127, 49-B10.



1974 ANNUAL INDEX

SUBJECT HEADINGS

Abundances 45 I-E3

Abundances, Cosmic-Ray 45 I-E3

Abundances, Nebular 45 I-E3

Abundances, Planetary 46 I-E4

Abundances, Solar 46 I-E4

Abundances, Stellar 46 I-E4

Airglow 47 I-E5

Apsidal Motion 47 I-E5

Associations 47 I-E5

Asteroids 47 I-E5

Atmospheres 47 I-E5

Atmospheres, Planetary 47 I-E5

Atmospheres, Solar 47 I-E5

Atmospheres, Stellar 47 I-E5

Atmospheres, Terrestrial 48 I-E6

Atomic and Molecular Processes 48 I-E6

Autoionization 48 I-E6

Ba II Stars 48 I-E6

Be Stars 48 I-E6

β Cephei Stars 49 I-E7

BL Lacertae Objects 49 I-E7

Binaries 49 I-E7

Black Holes 50 I-E8

Ca II Emission 50 I-E8

Carbon Stars 50 I-E8

Cataclysmic Stars: see Novae; U Geminorum Stars

Celestial Mechanics 51, I-E9

Cepheids and W Virginis Stars 51 I-E9

Chromospheres, Solar 51 I-E9

Chromospheres, Stellar 51 I-E9

Circumstellar Shells 51 I-E9

Cluster-Type Variables: see RR Lyrae Stars

Clusters: see Globular Clusters; Open Clusters

Collapsed Stars 51 I-E9

Combination Spectra 52 I-E10

Comets 52 I-E10

Convection 52 I-E10

Cool Stars: see Late-Type Stars

Corona, Solar 52 I-E10

Coronae, Stellar 52 I-E10

Coronal Lines 52 I-E10

Cosmic Background Radiation 52 I-E10

Cosmic Rays 53 I-E11

Cosmology 53 I-E11

Crab Nebula 53 I-E11

Deuterium 53 I-E11

Double Stars: see Visual Double or Multiple Stars

Dwarf Novae 54 I-E12

Early-Type Stars 54 I-E12

Eclipsing Binaries 54 I-E12

Elementary Particles 54 I-E12

Emission-Line Stars 54 I-E12

Equations: see Functions

Equation of State 55 I-E13

Excitation and Ionization: see Atomic Processes

f-Values: see Transition Probabilities

Faculae, Solar 55 I-E13

Faint Blue Stars 55 I-E13

Flares, Solar 55 I-E13

Forbidden Lines 55 I-E13

Functions 55 I-E13

Galactic Nuclei 55 I-E13

Galactic Structure 56 I-E14

Galaxies 56 I-E14

Galaxies, Clusters of 57 I-F1

Galaxies, Individual 57 I-F1

Galaxies, Motions in 58 I-F2

Galaxies, Photometry of 58 I-F2

Galaxies, Stellar Content of 58 I-F2

Galaxy, The 58 I-F2

Gamma-Ray Bursts 58 I-F2

Gamma Rays 58 I-F2

Gas Dynamics 59 I-F3

Gaseous Nebulae: see Nebulae

Globular Clusters 59 I-F3

Granules and Supergranules 59 I-F3

Granules and Supergranules, Solar 59 I-F3

Gravitation 59 I-F3

H II Regions: see Nebulae

High-Velocity Stars 59 I-F3

Horizontal-Branch Stars 60 I-F4

Hydrodynamics 60 I-F4

Hydrogen-deficient Stars 60 I-F4

Hydromagnetics 60 I-F4

Hyperfine Structure 61 I-F5

Image Processing 61 I-F5

Infrared 61 I-F5

Infrared Sources 62 I-F6

Instabilities 62 I-F6

Instruments 63 I-F7

Intergalactic Medium 63 I-F7

Interiors, Planetary 63 I-F7

Interiors, Solar 63 I-F7

Interiors, Stellar 63 I-F7

Interplanetary Medium 64 I-F8

Interstellar Extinction 64 I-F8

Interstellar Matter 64 I-F8

Interstellar Molecules 66 I-F10

Interstellar Reddening 66 I-F10

Ionization: see Atomic Processes

Jupiter 66 I-F10

Kinetic Theory: see Gas Dynamics; Hydrodynamics

- Late-Type Stars 66 I-F10
 Limb Darkening, Planetary 67 I-F11
 Limb Darkening, Solar 67 I-F11
 Line Formation 67 I-F11
 Line Identifications 67 I-F11
 Line Profiles 68 I-F12
 Long-Period Variables 69 I-F13
 Luminosities 69 I-F13
 Luminosity Functions: see Stellar Statistics
 Luminous Stars 69 I-F13
 Lunar Occultation 69 I-F13
- Magellanic Clouds 69 I-F13
 Magnetic Fields 70 I-F14
 Magnetic Fields, Solar 70 I-F14
 Magnetic Stars 70 I-F14
 Magnetohydrodynamics: see Hydromagnetics
 Mars 70 I-F14
 Masers 71 I-G1
 Mass Loss 71 I-G1
 Mass-Luminosity Relation 71 I-G1
 Massive Stars 71 I-G1
 Mercury 71 I-G1
 Metal-poor Stars: see Weak-Line Stars
 Metallic-Line Stars 71 I-G1
 Meteorites and Meteoroids 71 I-G1
 Microwave Radiation: see Radio Radiation
 Molecules 72 I-G2
 Molecules, Interstellar 72 I-G2
- Nebulae 73 I-G3
 Nebulae, Individual 74 I-G4
 Negative Ions 75 I-G5
 Neptune 75 I-G5
 Neutrinos 75 I-G5
 Neutron Stars 75 I-G5
 Novae 75 I-G5
 Nuclear Reactions 75 I-G5
 Nucleosynthesis 76 I-G6
- Of-Type Stars 76 I-G6
 Opacities 76 I-G6
 Open Clusters 77 I-G7
 Orion Nebula 77 I-G7
- Peculiar A Stars 78 I-G8
 Photometry 78 I-G8
 Planetary Nebulae 78 I-G8
 Plasmas 79 I-G9
 Polarization 79 I-G9
 Population II Stars 80 I-G10
 Pre-Main-Sequence Stars 80 I-G10
 Prominences, Solar 80 I-G10
 Proper-Motion Stars 80 I-G10
 Proper Motions: see Stellar Dynamics
 Pulsars 80 I-G10
 Pulsation 81 I-G11
- Quantum Mechanics 82 I-G12
 Quasi-stellar Sources or Objects 82 I-G12
- R Coronae Borealis Stars 82 I-G12
 RR Lyrae Stars 82 I-G12
 Radial Velocities 82 I-G12
 Radiative Transfer 83 I-G13
 Radio Lines 83 I-G13
 Radio Radiation 84 I-G14
- Radio Radiation, Planetary 84 I-G14
 Radio Radiation, Solar 84 I-G14
 Radio Sources 84 I-G14
 Radio Sources, Variable 85 2-A1
 Redshifts 85 2-A1
 Relativity 86 2-A2
 Rotation 86 2-A2
 Rotation, Solar 86 2-A2
 Rotation, Stellar 87 2-A3
- S-Type Stars 87 2-A3
 Satellites 87 2-A3
 Saturn 87 2-A3
 Seyfert Galaxies 87 2-A3
 Shock Waves 88 2-A4
 Short-Period Variables 88 2-A4
 Solar Activity 88 2-A4
 Solar Atmospheric Motions 88 2-A4
 Solar Spectra 88 2-A4
 Solar System 88 2-A4
 Solar Wind 88 2-A4
 Spectra, Infrared 88 2-A4
 Spectra, Laboratory 89 2-A5
 Spectra, Molecular 89 2-A5
 Spectra, Optical 89 2-A5
 Spectra, Planetary 89 2-A5
 Spectra, Radio 89 2-A5
 Spectra, Solar 89 2-A5
 Spectra, Ultraviolet 89 2-A5
 Spectra, X-Ray 90 2-A6
 Spectral Classification 90 2-A6
 Spectroheliograms 90 2-A6
 Spectrophotometry 90 2-A6
 Spectrum Variables 91 2-A7
 Star Formation 91 2-A7
 Stars, Individual 91 2-A7
 Stellar Dynamics 93 2-A9
 Stellar Evolution 93 2-A9
 Stellar Statistics 94 2-A10
 Stellar Winds 94 2-A10
 Subdwarfs 94 2-A10
 Sun 94 2-A10
 Sunspots 94 2-A10
 Supernova Remnants 94 2-A10
 Supernovae 94 2-A10
 Synchrotron Radiation 95 2-A11
- Transition Probabilities 95 2-A11
 Turbulence 95 2-A11
 21-Centimeter Radiation 95 2-A11
- U Geminorum Stars 96 2-A12
 Ultraviolet 96 2-A12
 Uranus 96 2-A12
- Variable Stars 96 2-A12
 Venus 97 2-A13
 Visual Double or Multiple Stars 97 2-A13
- Weak-Lined Stars 97 2-A13
 White-Dwarf Stars 97 2-A13
 Wolf-Rayet Stars 97 2-A13
- X-Ray Sources 98 2-A14
 X-Rays 100 2-B2
 X-Rays, Solar 100 2-B2
- Zeeman Effect 100 2-B2

1974 ANNUAL INDEX

SUBJECT INDEX

Abundances

- The Interstellar Abundance of Titanium. *George Wallerstein and Donald Goldsmith.* 187, 237, 4-B9
Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIV. An Extension of the Survey of Lyman- α from Interstellar Hydrogen. *Edward B. Jenkins and Blair D. Savage.* 187, 243, 4-C1
Depletion of Interstellar Sodium and Calcium. *Richard E. White.* 187, 449, 7-B13
Interstellar Abundances: Gas and Dust. *George B. Field.* 187, 453, 7-C3
Detection of Interstellar Lithium in the Direction of 55 Cygni. *Paul A. Vanden Bout and Gerald Grupsmith.* 187, L9, 3-B8
The Anomalous Abundance of Cosmic-Ray Nitrogen and Oxygen Nuclei at Low Energies. *F. B. McDonald, B. J. Teegarden, J. H. Trainor, and W. R. Webber.* 187, L105, 9-D12
Detection of ^{17}O in IRC+10216. *D. M. Rank, T. R. Geballe, and E. R. Wollman.* 187, L111, 9-E3
Ionization of Carbon and Nitrogen in the Intercloud Medium. *M. Kafatos, H. Gerola, S. Hatchett, and R. McCray.* 187, L113, 9-E5
Sodium Emission from Io: Implications. *Michael B. McElroy, Yuk Ling Yung, and Robert A. Brown.* 187, L127, 9-F3
A Search for OD in the Galactic Center. *Mark Allen, Diego A. Cesarsky, and Richard M. Crutcher.* 188, 33, 10-C5
Is X-ogen HCO $^+$? *Eric Herbst and William Klemperer.* 188, 255, 13-D6
Recombination Lines from H I Gas toward Orion A. *E. J. Chaissson and C. J. Lada.* 189, 227, 22-E3
Line Spectra in Interstellar Clouds. I. The Perseus 2 Cloud. *Frederic H. Chaffee, Jr.* 189, 427, 25-C5
The Interstellar Depletion Mystery, or Where Have All Those Atoms Gone? *J. Mayo Greenberg.* 189, L81, 24-F8
Interstellar Lines in the Ultraviolet Spectrum of Delta Scorpis. *Andrew M. Smith.* 190, 565, 35-F2
Some Recent Results from Galactic and Stellar Evolution Theory. *Raymond J. Talbot, Jr., and W. David Arnett.* 190, 605, 36-A11
Can Supernovae Produce Deuterium? *Richard I. Epstein, W. David Arnett, and David N. Schramm.* 190, L13, 30-E3
Anomalies in the Composition of Interplanetary Heavy Ions with $0.01 < E < 40$ MeV per amu. *J. H. Chan and P. B. Price.* 190, L39, 30-G3
Isotopic Abundances and Line Formation in the Orion Nebula. *P. G. Wannier, P. J. Encrenaz, R. W. Wilson, and A. A. Penzias.* 190, L77, 34-A1
Search for Deuterium in Orion and Detection of High-Velocity Features. *W. A. Traub, N. P. Carleton, and D. J. Hegyi.* 190, L81, 34-A4
A Comparison of Interstellar Na I, Ca II, and K I Absorption. *L. M. Hobbs.* 191, 381, 43-G6
Statistical Properties of Interstellar Clouds. *L. M. Hobbs.* 191, 395, 44-A7
Are Stellar Surface Heavy-Element Abundances Systematically Enhanced? *Paul C. Joss.* 191, 771, 48-F1
Neutral Potassium in Dusty Clouds. *Barry L. Lutz.* 191, L131, 49-C1

- Oscillator Strengths for Neutral Sodium and the Interstellar Sodium Abundance in Zeta Ophiuchi. *Peter Erman, J. Brzozowski, and Wm. Hayden Smith.* 192, 59, 50-D11

Galactic Evolution and the Formation of the Light Elements. *Jean Audouze and Beatrice Tinsley.* 192, 487, 56-E5

- Arc Measurements of Fe I Oscillator Strengths. *J. M. Bridges and R. L. Kornblith.* 192, 793, 61-B5
Further Observations at the Interstellar Deuterium Frequency. *Jay M. Pasachoff and Diego A. Cesarsky.* 193, 65, 63-E13

- Composition of Heavy Cosmic Rays from 25 to 180 MeV Per Atomic Mass Unit. *R. L. Fleischer, H. R. Hart, Jr., and A. Renshaw.* 193, 575, 70-F2

- Column Densities of Interstellar Molecular Hydrogen. *Lyman Spitzer, Jr., William D. Cochran, and Alan Hirshfield.* 193, 759, 72-E4; Suppl. 28, 373 (No. 266)

- Interstellar Abundances toward Zeta Ophiuchi. *Donald C. Morton.* 193, L35, 66-C6

- The $^{12}\text{C}/^{13}\text{C}$ Ratio in Comet Kohoutek (1973f). *A. C. Danks, D. L. Lambert, and C. Arpigny.* 194, 745, 84-B1

Abundances, Cosmic-Ray

- New Limit on the Interstellar Abundance of Boron. *Donald C. Morton, Andrew M. Smith, and Theodore P. Stecker.* 189, L109, 27-C11

- Observation of Trans-Iron Solar-Flare Nuclei in an Apollo 16 Command Module Window. *E. K. Shirk.* 190, 695, 37-A12

- An Interpretation of the Observed Oxygen and Nitrogen Enhancements in Low-Energy Cosmic Rays. *L. A. Fisk, B. Kozlovsky, and R. Ramaty.* 190, L35, 30-F14

- Monte Carlo Analysis of the Solar-Wind Modulation of Galactic C-N-O at Solar Maximum. *T. A. Moss and R. T. Giulii.* 192, 753, 60-F8

Abundances, Nebular

- The Chemistry of Sulfur in Interstellar Clouds. *M. Oppenheimer and A. Dalgarno.* 187, 231, 4-B4

- Ion-Molecule Reactions, Molecule Formation, and Hydrogen-Isotope Exchange in Dense Interstellar Clouds. *William D. Watson.* 188, 35, 10-C7

- Helium Abundance at the Galactic Center. *M. Jura and E. L. Wright.* 188, 473, 16-C2

- The He $^+$ /H $^+$ Ratio in Dark Coords. *Robert L. Brown and J. Gómez-González.* 188, 475, 16-C4

- High Helium Abundances in Two Planetary Nebulae. *James B. Kaler.* 188, L15, 12-D1

- $^{12}\text{C}/^{13}\text{C}$ Abundance Ratios from Observations of Interstellar H $_2$ C $^{13}\text{C}^1\text{O}$. *B. Zuckerman, D. Buhl, Patrick Palmer, and L. E. Snyder.* 189, 217, 22-D7

- X-Ray Ionization and the Helium Abundance in 3C 120. *G. A. Shields.* 191, 309, 43-B8

- High-Frequency Observations of Possible "Heavy-Element" Recombination Lines. *E. J. Chaissson.* 191, 411, 44-B8

- The Fractional Ionization in Dense Interstellar Clouds. *M. Oppenheimer and A. Dalgarno.* 192, 29, 50-B11

- Spectrophotometric Studies of Gaseous Nebulae. XXIII. The Planetary Nebula NGC 6803. *P. Lee, L. H. Aller, J. B. Kaler, and S. J. Czyzak.* 192, 159, 51-D10

- Radio-Continuum Measurements of Planetary Nebulae at 15.5

- Abundances, Nebular — Continued**
- GHz. *Gopal Sistla, G. Kojoian, and E. J. Chaisson.* **192**, 165, 51-E1
 - Optical Interstellar Lines in Dark Clouds. II. K I and Ultraviolet Sodium Lines. *Judith G. Cohen.* **192**, 379, 55-D7
 - Helium in Southern H II Regions. I. *J. Danziger.* **193**, 69, 63-F2
 - Chemical Composition of H II Regions in the Large Magellanic Cloud and Its Cosmological Implications. *Manuel Peimbert and Silvia Torres-Peimbert.* **193**, 327, 67-C8
 - Composition Gradients Across Spiral Galaxies. *G. A. Shields.* **193**, 335, 67-D2
- Abundances, Planetary**
- A New Upper Limit for an Atmosphere of CO₂, CO on Mercury. *Uwe Fink, Harold P. Larson, and Richard F. Poppen.* **187**, 407, 5-G2
 - Ammonia Absorption Relevant to the Albedo of Jupiter. II. Interpretation. *Martin G. Tomasko.* **187**, 641, 9-B5
 - On the Upper Atmosphere of Neptune. *J. Veverka, L. Wasserman, and Carl Sagan.* **189**, 569, 26-F7
 - Deuterium Enrichment of Metallic Hydrogen. *W. B. Hubbard.* **190**, 223, 30-B11
 - The Occultation of Beta Scorpii by Jupiter. II. The Hydrogen-Helium Abundance in the Jovian Atmosphere. *J. L. Elliot, L. H. Wasserman, J. Veverka, Carl Sagan, and W. Liller.* **190**, 719, 37-C6
 - The Search for HD in the Spectrum of Uranus: An Upper Limit to [D/H]. *Barry L. Lutz and Tobias Owen.* **190**, 731, 37-D3
 - Hydrocarbon Abundances in the Jovian Atmosphere. *Darrell F. Strobel.* **192**, L47, 53-D5
- Abundances, Solar**
- Relative Coronal Abundances Derived from X-Ray Observations. I. Sodium, Magnesium, Aluminum, Silicon, Sulfur, and Argon. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss.* **188**, 423, 15-B9
 - Relative Coronal Abundances Derived from X-Ray Observations. II. Nitrogen, Oxygen, Neon, Magnesium, and Iron. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss.* **192**, 169, 51-E5
 - Relative Coronal Abundances Derived from X-Ray Observations. III. The Effect of Cascades on the Relative Intensity of Fe XVII Line Fluxes, and a Revised Iron Abundance. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss.* **194**, 471, 79-F5
- Abundances, Stellar**
- Spectroscopic Comparison of Open Clusters. I. The Reddening, Blanketing, and Metallicity of M67. *Don C. Barry and Richard H. Cromwell.* **187**, 107, 2-A11
 - The Composition and Evolutionary Status of the Helium-rich Stars. *Patrick S. Osmer and Deane M. Peterson.* **187**, 117, 2-B6
 - Lines of Neutral Barium and the Abundance of Barium in Two K Supergiants. *A. R. Hyland and J. R. Mould.* **187**, 277, 4-E5
 - Low-Temperature Photoneutron Sources for Stellar Nucleosynthesis. *Thomas G. Harrison and Terry W. Edwards.* **187**, 303, 4-G2
 - A Photoneutron Mechanism for the Production of Technetium-99 in the Interior of Evolved Stars. *Terry W. Edwards and Thomas G. Harrison.* **187**, 313, 4-G11
 - On the Abundance of Europium. *Mark R. Hartog, Charles R. Cowley, and Saul J. Adelman.* **187**, 551, 8-C1
 - The Oxygen Abundance in the Metal-deficient Star HD 122563. *D. L. Lambert, C. Sneden, and L. M. Ries.* **188**, 97, 11-A9
 - Constraints on the Evolutionary History of Stars Showing *s*-processed Material. *Barry M. Schlesinger.* **188**, 141, 11-D8
 - Metallicity in Border Regions of the Am Domain. III. Analysis of the Hot Stars Alpha Geminorum A and B and Theta Leonis. *Myron A. Smith.* **189**, 101, 20-A7
 - A Comparison of Variable and Nonvariable Stars in the Cepheid Strip. *Edward G. Schmidt, Jeffrey D. Rosenthal, and C. P. Jewsbury.* **189**, 293, 23-C5
 - Cyanogen-Band Strengths of Giant Stars in 47 Tucanae. *Robert D. McClure and Wayne Osborn.* **189**, 405, 25-A11
 - The Old Open Cluster NGC 2420. *Robert D. McClure, William T. Forrester, and James Gibson.* **189**, 409, 25-A14
 - Intermediate-Band Photometry of M67. *K. A. Janes.* **189**, 423, 25-C1
 - Carbon and Nitrogen Abundances in Metal-poor Stars. *Christopher Sneden.* **189**, 493, 26-A4
 - FG Sagittae: The *s*-Process Episode. *G. E. Langer, Robert P. Kraft, and Kurt S. Anderson.* **189**, 509, 26-B5
 - Nucleosynthesis of Lithium in Low-Energy Flares. *Ramon Canal.* **189**, 531, 26-C12
 - On the Stellar Content and Reddening in the Nucleus of NGC 5195. *John W. Warner.* **190**, 19, 28-B7
 - The Mass of M31 as Determined from the Motions of its Globular Clusters. *F. D. A. Hartwick and W. L. W. Sargent.* **190**, 283, 31-D3
 - The Carbon Monoxide Band Strength and ¹²C/¹³C Ratio in K Giants. *Stephen T. Ridgway.* **190**, 591, 35-G12
 - Resolution of the Praseodymium Abundance Anomaly in the Ba II Stars. *Marc S. Allen and Charles R. Cowley.* **190**, 601, 36-A7
 - Core-Helium-Burning Stars in Young Clusters in the Large Magellanic Cloud. *J. W. Robertson.* **191**, 67, 39-F6
 - The Composition of RR Lyrae Stars. *A. W. Rodgers.* **191**, 433, 44-D4
 - Iron Production by ¹²C-Detonation Supernovae. *W. David Arnett.* **191**, 727, 48-C2
 - An Analysis of the CH Star HD 198269. *Paul Lee.* **192**, 133, 51-B13
 - Further Observations of Stars in the Intermediate-Age Open Cluster NGC 2477. *F. D. A. Hartwick and James E. Hesser.* **192**, 391, 55-E7
 - Studies of Evolved Stars. III. Models of FG Sagittae Consistent with *s*-Process Nucleosynthesis. *Roger K. Ulrich.* **192**, 507, 56-F10
 - The Peculiar A Star HD 200311: A Photographic Region Line-Identification Study. *Saul J. Adelman.* **192**, 573, 57-D5; Suppl. **28**, 51 (No. 254)
 - Observed Departures from LTE in Stellar Fe I Lines. II. Arcturus. *Myron A. Smith.* **192**, 623, 59-D9
 - Constraints on Models for Chemical Evolution in the Solar Neighborhood. *Beatrice M. Tinsley.* **192**, 629, 59-E1
 - The Negative Correlation between the Carbon-to-Iron Ratio and the Iron Abundance. *Raymond J. Talbot, Jr.* **192**, 643, 59-F1
 - CNO Abundances and Hydrodynamic Models of the Nova Outburst. III. 0.5 M_{\odot} Models with Enhanced Carbon, Oxygen, and Nitrogen. *Summer Starrfield, Warren M. Sparks, and James W. Truran.* **192**, 647, 59-F5
 - Physical Characteristics of Giant Stars in the Anomalous Globular Cluster NGC 362. *Robert D. McClure and John Norris.* **193**, 139, 64-D1
 - A Lower Limit on the ¹²C/¹³C Ratio in Alpha Herculis. *Roger I. Thompson and Harold L. Johnson.* **193**, 147, 64-D8
 - On the Origin and Evolution of *s*-Process Elements. *David N. Schramm and Beatrice M. Tinsley.* **193**, 151, 64-D12
 - On the *e*-Process: Its Components and their Neutron Excesses. *Kem L. Hainebach, Donald D. Clayton, W. David Arnett, and S. E. Woosley.* **193**, 157, 64-E3
 - The Effects of Differences in Composition, Equation of State, and Mixing Length upon the Structure of White-Dwarf Convection Zones. *G. Fontaine, H. M. Van Horn, K.-H. Böhm, and T. C. Grenfell.* **193**, 205, 65-A9
 - Physical Characteristics of Giant Stars in the Draco Dwarf Spheroidal Galaxy. *F. D. A. Hartwick and Robert D. McClure.* **193**, 321, 67-C3
 - UBVr Colors for Population II Giants. *Erika Böhm-Vitense and Paula Szkody.* **193**, 607, 71-A4
 - The ¹²C/¹³C Ratio in Stellar Atmospheres. II. CN and CO in Alpha Orionis. *D. L. Lambert, D. S. Dearborn, and C. Sneden.* **193**, 621, 71-B4
 - The ¹²C/¹³C Ratio in Stellar Atmospheres. III. Alpha Tauri, Beta Geminorum, and Mu Leonis. *J. Tomkin and D. L. Lambert.* **193**, 631, 71-C1

- The Peculiar A Star HD 168733. II. A Model-Atmosphere Analysis. *Stephen J. Little.* 193, 639, 71-C8
- Neutral Helium Line Strengths. VII. The Population II B Star Barnard 29 in M13. *L. H. Auer and John Norris.* 194, 87, 74-G12
- Advanced Evolution in Globular Clusters. II. The Ultraviolet-bright Stars, in Omega Centauri. *John Norris.* 194, 194, 109, 75-B4
- Element Identifications in Five Ap Stars. *Charles R. Cowley, Mark R. Hartoog, and Anne P. Cowley.* 194, 343, 78-D5
- Possible Abundance Difference among Giant Stars in NGC 188. *Robert D. McClure.* 194, 355, 78-E6
- Studies of Evolved Stars. IV. Band Strength Ratios as Indicators of Mixing in M, MS, and S Stars. *John M. Scalo.* 194, 361, 78-E12
- The $^{12}\text{C}/^{13}\text{C}$ Ratio in the Atmosphere of the K2 Supergiant Epsilon Pegasi. *David L. Lambert and Jocelyn Tomkin.* 194, L89, 80-G1
- An Additional Constraint on the Early Evolution of the Galaxy from New Observations of 47 Tucanae. *F. D. A. Hartwick and James E. Hesser.* 194, L129, 84-E2
- The Abundance of Boron and Beryllium in Alpha Lyrae. *Ann Merchant Boesgaard, Françoise Praderie, David S. Leckrone, R. Faraggiana, and M. Hack.* 194, L143, 84-F1
- Airglow**
- Observations of He I 584 Å Nighttime Radiation: Evidence for an Interstellar Source of Neutral Helium. *Francesco Paresce, Stuart Bowyer, and Shailendra Kumar.* 187, 633, 9-A12
- Apsidal Motion**
- The Structure of Alpha Virginis. II. The Apsidal Constant. *Andrew P. Odell.* 192, 417, 55-G6
- The Apsidal-Motion Test for Models of Main-Sequence Stars. *Richard Stothers.* 194, 651, 83-B11
- Associations**
- The OB Stellar Associations in the Large Magellanic Cloud. *Peter B. Lucke.* 192, 573, 57-D5; Suppl. 28, 73 (No. 255)
- Asteroids**
- 12-Micron Emission Features of the Galilean Satellites and Ceres. *Olav L. Hansen.* 188, L31, 12-E2
- Radiometric Diameters and Albedos of 40 Asteroids. *David Morrison.* 194, 203, 76-B1
- Atmospheres**
- The Effect of Sphericity on Stellar Continuous Energy Distributions. *John I. Castor.* 189, 273, 23-B1
- Atmospheres, Planetary**
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIII. The Albedos of Jupiter, Uranus, and Neptune. *Blair D. Savage and John J. Caldwell.* 187, 197, 2-G8
- Raman Scattering from H₂ in Jupiter. *H. Fast, R. Poeckert, and J. R. Auman.* 187, 403, 5-F13
- A New Upper Limit for an Atmosphere of CO₂, CO on Mercury. *Uwe Fink, Harold P. Larson, and Richard F. Poppen.* 187, 407, 5-G2
- Ammonia Absorption Relevant to the Albedo of Jupiter. II. Interpretation. *Martin G. Tomasko.* 187, 641, 9-B5
- The 7.5- to 13.5-Micron Spectrum of Saturn. *F. C. Gillett and W. J. Forrest.* 187, L37, 3-D6
- Radiative Transfer within the Mesospheres of Venus and Mars. *V. Ramanathan and R. D. Cess.* 188, 407, 15-A5
- Radiative-Dynamical Equilibrium States for Jupiter. *L. M. Trafton and P. H. Stone.* 188, 649, 18-A10
- On the Upper Atmosphere of Neptune. *J. Veverka, L. Wasserman, and Carl Sagan.* 189, 569, 26-F7
- An Exact Expression for the Temperature Structure of a Homogeneous Planetary Atmosphere Containing Isotropic Scatterers. *Bruce R. Barkstrom.* 190, 225, 30-B13
- Formation of Coupled Spectral Lines in a Planetary Atmosphere. *J. W. Chamberlain and L. Wallace.* 190, 487, 33-D7
- The Occultation of Beta Scorpii by Jupiter. II. The Hydrogen-Helium Abundance in the Jovian Atmosphere. *J. L. Elliot, L. H. Wasserman, J. Veverka, Carl Sagan, and W. Liller.* 190, 719, 37-C6
- Energetic Electrons in Jupiter's Magnetosphere. *F. V. Coroniti.* 191, 287, 41-G1; Suppl. 27, 261 (No. 244)
- Radiative Transfer of Partially Polarized Light. *C. Acquista and J. L. Anderson.* 191, 567, 45-F2
- Solution of the Inhomogeneous Rayleigh Scattering Atmosphere. *M. J. Prather.* 192, 787, 61-A13
- Sodium D-Line Emission from Io: Sputtering and Resonant Scattering Hypothesis. *Dennis L. Matson, Torrence V. Johnson, and Fraser P. Fanale.* 192, L43, 53-D1
- Hydrocarbon Abundances in the Jovian Atmosphere. *Darrell F. Strobel.* 192, L47, 53-D5
- Evidence for an Internal Heat Source in Neptune. *Robert E. Murphy and Laurence M. Trafton.* 193, 253, 65-D12
- The Thermal Structure of the Atmosphere of Jupiter. *L. Wallace, Michael Prather, and J. S. Belton.* 193, 481, 68-G9
- Sulfuric Acid Cloud Interpretation of the Infrared Spectrum of Venus. *John V. Martonchik.* 193, 495, 69-A8
- Infrared Measurements of Uranus and Neptune. *G. H. Rieke and F. J. Low.* 193, L147, 73-B1
- Spectroscopic Observations of Io. *Yu. Mekler and A. Eviatar.* 193, L151, 73-B5
- Jupiter: A Comment on the 8- to 14-Micron Limb Darkening. *L. Trafton and R. Wildey.* 194, 499, 80-B1
- New Evidence for the Variability of Titan. *M. Noland, J. Veverka, and J. Goguen.* 194, L157, 84-G2
- Atmospheres, Solar**
- Hydraulic Concentration of Magnetic Fields in the Solar Photosphere. I. Turbulent Pumping. *E. N. Parker.* 189, 563, 26-F1
- Observed Departures from LTE in Stellar Fe I Lines. I. The Sun. *Myron A. Smith.* 190, 481, 33-D1
- Analysis of the Solar Magnesium I Spectrum. *Richard C. Altrock and Richard C. Canfield.* 194, 733, 84-A3
- Non-LTE H₂⁺ as the Source of Missing Opacity in the Solar Atmosphere. *K. S. Krishna Swamy and Theodore P. Stecher.* 194, L153, 84-F12
- Atmospheres, Stellar**
- The Composition and Evolutionary Status of the Helium-rich Stars. *Patrick S. Osmer and Deane M. Peterson.* 187, 117, 2-B6
- A Comparison of the Straight-Mean, Harmonic-Mean, and Multiple-Pickett Approximations for the Line Opacities in Cool Model Atmospheres. *Duane F. Carbon.* 187, 135, 2-C9
- Formation of the Luminosity-sensitive O I Multiplet at 7774 Å. *H. R. Johnson, R. W. Milkey, and L. W. Ramsey.* 187, 147, 2-D7
- Spectroscopic Studies of O-Type Stars. IV. Lines in the Red Region. *Peter S. Conti.* 187, 539, 8-B4
- Polarization by Rotationally Distorted Electron-Scattering Atmospheres. *Joseph P. Cassinelli and Bernhard M. Haisch.* 188, 101, 11-A13
- A Line-blanketed Model Stellar Atmosphere of Sirius. *John W. Fowler.* 188, 295, 13-G3
- Stellar Spectral Synthesis in the Ultraviolet. *Robert L. Kurucz.* 188, L21, 12-D6
- A Comparison of Variable and Nonvariable Stars in the Cepheid Strip. *Edward G. Schmidt, Jeffrey D. Rosenthal, and C. P. Jewsbury.* 189, 293, 23-C5
- The Effects of Rapid, Differential Rotation on the Spectra of White Dwarfs. *Robert L. Milton.* 189, 543, 26-D9
- Some Observational Implications of Extended Static O-Star Model Atmospheres. *Dimitri Mihalas and David G. Hummer.* 189, L39, 21-B9
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XV. The Strongly Magnetic Variable HD 215441. *David S. Leckrone.* 190, 319, 31-F10
- Radiative Transfer of Partially Polarized Light. *C. Acquista and J. L. Anderson.* 191, 567, 45-F2
- Calibrations and Applications of the uvby Photometric System. *Michel Breger.* 192, 75, 50-F4
- Stellar Model Chromospheres. II. Procyon (F5 IV-V). *Thomas R. Ayres, Jeffrey L. Linsky, and Richard A. Shine.* 192, 93, 50-G7

Atmospheres, Stellar — Continued

- Observed Departures from LTE in Stellar Fe I Lines. II. Arcturus. *Myron A. Smith*. **192**, 623, 59-D9
- A Lower Limit on the $^{12}\text{C}/^{13}\text{C}$ Ratio in Alpha Herculis. *Roger J. Thompson and Harold L. Johnson*. **193**, 147, 64-D8
- Theory of Extended Stellar Atmospheres. I. Computational Method and First Results for Static Spherical Models. *Dimitri Mihalas and D. G. Hummer*. **193**, 503, 69-B1; Suppl. **28**, 343 (No. 265)
- Nucleation and Growth of Dust Grains. *E. E. Salpeter*. **193**, 579, 70-F5
- Formation and Flow of Dust Grains in Cool Stellar Atmospheres. *E. E. Salpeter*. **193**, 585, 70-F11
- The Peculiar A Star HD 168733. II. A Model-Atmosphere Analysis. *Stephen J. Little*. **193**, 639, 71-C8
- Transfer of Line Radiation in Differentially Expanding Atmospheres. IV. The Two-Level Atom in Plane-parallel Geometry Solved by the Feautrier Method. *Peter D. Noerdlinger and George B. Rybicki*. **193**, 651, 71-D5
- Atmospheres, Terrestrial**
- Seeing: Its Cause and Cure. *A. T. Young*. **189**, 587, 26-G11
- Atomic and Molecular Processes**
- A Note on Ionization Equilibrium. *Donald L. Lafferty*. **187**, 209, 3-A7
- Highly Excited States of Atoms in a Magnetic Field. *R. F. O'Connell*. **187**, 275, 4-E3
- A Theoretical and Experimental Study of Fe xix to Fe xxiv Solar-Flare Spectra and Isoelectronic Spectra in Sulfur. *B. C. Fawcett, R. D. Cowan, and R. W. Hayes*. **187**, 377, 5-E3
- The Poynting-Robertson Effect and Eddington Limit for Electrons Scattering with Hard Photons. *George R. Blumenthal*. **188**, 121, 11-C4
- The He^+/H^+ Ratio in Dark Clouds. *Robert L. Brown and J. Gómez-González*. **188**, 475, 16-C4
- Multiple Inverse Compton Scattering and the Diffuse X-Ray Component. *A. Bui-Van and K. Hurley*. **188**, L51, 15-E6
- Statistical Time-dependent Model for the Interstellar Gas. *Humberto Gerola, Minas Kafatos, and Richard McCray*. **189**, 55, 19-E1
- Electron-Hydrogen Photoattachment as a Source of Ultraviolet Absorption. *G. W. F. Drake*. **189**, 161, 20-E9
- X-Ray Ionization Cross-Sections, and Ionization Equilibrium Equations Modified by Auger Transitions. *Jon C. Weisheit*. **190**, 735, 37-D7
- Upper Limits to the Flux of Cosmic Rays and X-Rays in Interstellar Clouds. *Edward J. O'Donnell and William D. Watson*. **191**, 89, 40-A1
- Fe I Fluorescence in T Tauri Stars. *L. A. Willson*. **191**, 143, 40-D4
- Solar-Flare Emission Lines in the Range from 66 to 171 Å: $2s^2p^k-2s^{k-1}2p^{k+1}$ Transitions in Highly Ionized Iron. *S. O. Kastner, W. M. Neupert, and M. Szwarc*. **191**, 261, 41-E3
- X-Ray Ionization and the Helium Abundance in 3C 120. *G. A. Shields*. **191**, 309, 43-B8
- Laboratory Measurements of Some Ion-Molecule Reactions Related to the Formation of HCN in Dense Interstellar Clouds. *H. I. Schiff, R. S. Hemsworth, J. D. Payzant, and D. K. Bohme*. **191**, L49, 42-D7
- Is H α a Source of Diffuse Interstellar Lines? *E. Herbst, T. A. Patterson, D. W. Norcross, and W. C. Lineberger*. **191**, L143, 49-C11
- The Fractional Ionization in Dense Interstellar Clouds. *M. Oppenheimer and A. Dalgarno*. **192**, 29, 50-B11
- Theoretical Helium I Emission-Line Intensities for Quiescent Prominences. *J. N. Heasley, Dimitri Mihalas, and A. I. Poland*. **192**, 181, 51-F4
- Effect of Inelastic Electron-Atom Collisions on the Balmer Decrement. *W. M. Adams and Vahé Petrosian*. **192**, 199, 51-G8
- Multiplet Splittings and $^1\text{S}_0-^3\text{P}^1$ Intercombination-Line Oscillator Strengths in Be I and Mg I. *C. Laughlin and G. A. Victor*. **192**, 551, 57-B12
- Interstellar Molecules: Origin by Catalytic Reactions on Grain Surfaces? *Edward Anders, Ryoichi Hayatsu, and Martin H. Studier*. **192**, L101, 58-A5
- Electron-Impact Excitation Cross-Sections for Complex Ions. I. Theory for Ions with One and Two Valence Electrons. *Douglas H. Sampson*. **193**, 289, 65-G5; Suppl. **28**, 309 (No. 263)
- Electron-Impact Excitation Cross-Sections for Complex Ions. II. Application to the Isoelectronic Series of Helium and Other Light Elements. *Douglas H. Sampson and Allen D. Parks*. **193**, 289, 65-G5; Suppl. **28**, 323 (No. 263)
- Relative Coronal Abundances Derived from X-Ray Observations. III. The Effect of Cascades on the Relative Intensity of Fe XVII Line Fluxes, and a Revised Iron Abundance. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **194**, 471, 79-F5
- Radiative and Predissociation Probabilities for Individual Rotational Levels of the $B^3\Sigma^-$ State of CH with Application to the Radiative Recombination of CH in the Interstellar Medium. *Neil H. Brooks and Wm. Hayden Smith*. **194**, 513, 80-C1
- Analysis of the Solar Magnesium I Spectrum. *Richard C. Altrock and Richard C. Canfield*. **194**, 733, 84-A3
- Autoionization**
- Theoretical Analysis of the Al I Absorption Spectrum. *C. D. Lin*. **187**, 385, 5-E10
- Autoionization Spectra of Beryllium (Be I and Be II) in the 110- to 140-eV Energy Range. *G. Mehlman and J. M. Esteva*. **188**, 191, 12-A1
- Autoionization Spectra of Magnesium (Mg I, Mg II, and Mg III) in the 50- to 110-eV Energy Range. *J. M. Esteva and G. Mehlman*. **193**, 747, 72-D7
- Ba II Stars**
- Lines of Neutral Barium and the Abundance of Barium in Two K Supergiants. *A. R. Hyland and J. R. Mould*. **187**, 277, 4-E5
- Carbon and Eruptive Stars: Surface Enrichment of Lithium, Carbon, Nitrogen, and ^{13}C by Deep Mixing. *I. Juliania Sackmann, Richard L. Smith, and Keith H. Despain*. **187**, 555, 8-C5
- The Old Open Cluster NGC 2420. *Robert D. McClure, William T. Forrester, and James Gibson*. **189**, 409, 25-A14
- Mean Absolute Magnitudes of Carbon Stars and Related Objects. *John H. Baumert*. **190**, 85, 28-G4
- Resolution of the Praseodymium Abundance Anomaly in the Ba II Stars. *Marc S. Allen and Charles R. Cowley*. **190**, 601, 36-A7
- Be Stars**
- A Model Envelope for the Shell Star 1 Delphini. *J. M. Marlborough and A. P. Cowley*. **187**, 99, 2-A4
- Polarization by Rotationally Distorted Electron-Scattering Atmospheres. *Joseph P. Cassinelli and Bernhard M. Haisch*. **188**, 101, 11-A13
- A Dust-Shell Model of the Infrared Object HD 45677. *John P. Apruzese*. **188**, 539, 16-G10
- Short-Period Radial-Velocity Variations in π Aquarii. *Adela E. Ringuelet and Marcos E. Machado*. **189**, 285, 23-B12
- Profiles of Emission Lines in Be Stars. III. Further Study of the Long-Period V/R Variation. *Elise Albert and Su-Shu Huang*. **189**, 479, 25-G5
- The Nature of Infrared Excesses in Extreme Be Stars. *Rudolph Schild, Frederic Chaffee, Jay A. Frogel, and S. Eric Persson*. **190**, 73, 28-F7
- Photoelectric Profile Measurements of H α and H β in Be Stars. *David F. Gray and J. M. Marlborough*. **190**, 505, 33-E7; Suppl. **27**, 121 (No. 240)
- Infrared Observations of Be Stars from 2.3 to 19.5 Microns. *R. D. Gehrz, J. A. Hackwell, and T. W. Jones*. **191**, 675, 47-F8
- Evidence for the Existence of a Massive Companion to X Persei (=2U 0352+30?). *J. B. Hutchings, A. P. Cowley, D. Crampton, and R. O. Redman*. **191**, L101, 49-A2
- Steady-State Mass Loss for Be Stars. *D. Nelson Limber*. **192**, 429, 56-A5
- B Cephei Stars**

- An Excitation Mechanism for Pulsations in Beta Cephei Stars. *Yoji Osaki.* **189**, 469, 25-F10
- On the Beat Phenomenon in the Beta Cephei Stars. *R. G. Deupree.* **190**, 631, 36-D1
- The Beta Cephei Nature of Spica. *Robert J. Dukes, Jr.* **192**, 81, 50-F10
- Nonlinear, Adiabatic, Nonradial Stellar Pulsation: Calculations and Applications. *Robert G. Deupree.* **194**, 393, 79-A3
- BL Lacertae Objects**
- Parkes 0548-322: A BL Lacertae Object in a Cluster of Galaxies. *M. J. Disney.* **193**, L103, 72-E11
- The Redshift and Composite Nature of PKS 1514-24. *M. J. Disney, B. A. Peterson, and A. W. Rodgers.* **194**, L79, 80-F4
- Binaries**
- Spectroscopic Observations of HD 153919 (2U 1700-37). *Sidney C. Wolff and Nancy D. Morrison.* **187**, 69, 1-E11
- Spectroscopic Observations of HZ Herculis. *David Crampton.* **187**, 345, 5-B13
- A Determination of the Cooling Time and the Speed of the Surface Currents of HZ Herculis. *Richard E. Dahab.* **187**, 351, 5-C7
- 2U 1700-37: Another Black Hole? *M. S. Bessell, B. A. Peterson, D. T. Wickramasinghe, and N. V. Vidal.* **187**, 355, 5-C10
- A Slaved Disk Model for Hercules X-1. *Wm. James Roberts.* **187**, 575, 8-D11
- Black Holes in Binary Systems: Instability of Disk Accretion. *Alan P. Lightman and Douglas M. Eardley.* **187**, L1, 3-B2
- Supergiant Binary Stars. *Roberta M. Humphreys and E. P. Ney.* **187**, L75, 6-C12
- Supernova: The Result of the Death Spiral of a White Dwarf into a Red Giant. *Warren M. Sparks and Theodore P. Stecher.* **188**, 149, 11-E1
- A Ten-Day Observation of Hercules X-1 from the OSO-7 Satellite. *J. E. McClintock, G. W. Clark, W. H. G. Lewin, H. W. Schnopper, C. R. Canizares, and G. F. Sprott.* **188**, 159, 11-E9
- 2U 0900-40: A Black Hole? *D. T. Wickramasinghe, N. V. Vidal, M. S. Bessell, B. A. Peterson, and M. E. Perry.* **188**, 167, 11-F4
- Reinvestigation of Certain Long-Period A-Type Binaries. *Helmut A. Abt and Saul G. Levy.* **188**, 291, 13-F13
- The Synthesis of Close-Binary Light Curves. VI. X-Ray and Collapsar Binaries. *J. B. Hutchings.* **188**, 341, 14-C4
- Optical Spectra and the Mass of SMC X-1. *Patrick S. Ossmer and W. A. Hiltner.* **188**, L5, 12-C5
- Upper Limit on 2.5-Second Pulsations from Hercules X-1. *Y. Avni, J. N. Bahcall, P. C. Joss, E. Schreier, H. Tananbaum, and D. Q. Lamb.* **188**, L35, 15-D6
- Soft X-Ray Variability of Binary X-Ray Stars. *James Buff and Richard McCray.* **188**, L37, 15-D7
- Numerical Simulation of the Gas Flow in Close Binary Systems. *K. H. Prendergast and R. E. Taam.* **189**, 125, 20-C3
- Short-Period Radial-Velocity Variations in π Aquarii. *Adela E. Ringuelet and Marcos E. Machado.* **189**, 285, 23-B12
- High-Frequency Stellar Oscillations. X. The Rapid Blue Variable CD-42°14462. *James E. Hessler, Barry M. Lasker, and Patrick S. Ossmer.* **189**, 315, 23-D14
- The Nature of Cygnus X-3: A Prototype for Old-Population Binary X-Ray Sources. *Arthur Davidsen and Jeremiah P. Ostriker.* **189**, 331, 23-F1
- An Investigation of Accretion of Matter onto White Dwarfs as a Possible X-Ray Mechanism. *A. J. DeGregoria.* **189**, 555, 26-E7
- Multiple Star Systems and X-Ray Sources. *J. N. Bahcall, F. J. Dyson, J. I. Katz, and B. Paczyński.* **189**, L17, 21-A1
- Observations of H α in HDE 226868. *R. J. Brucato and R. R. Zappala.* **189**, L71, 24-E11
- Spectroscopic Observations of the Optical Companion to Centaurus X-3. *J. J. Rickard.* **189**, L113, 27-D1
- The Fission Theory of Binary Stars. II. Stability to Third-Harmonics Disturbances. *N. R. Lebovitz.* **190**, 121, 29-B12
- The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis. *Steven A. Grandi, Paul M. N. O. Hintzen, Eric B. Jensen, Anthony E. Rydgren, John S. Scott, Philip M. Stickney, John A. J. Whelan, and Simon P. Worden.* **190**, 365, 32-C1
- Infrared Stars in Binary Systems. *Roberta M. Humphreys and E. P. Ney.* **190**, 339, 32-A1
- Do OB Runaways Have Collapsed Companions? *Jacob D. Bekenstein and Richard L. Bowers.* **190**, 653, 36-E11
- Optical Observations of HD 77581 and a Model for the System HD 77581-2U 0900-40. *Larry D. Petro and W. A. Hiltner.* **190**, 661, 36-F7
- Copernicus Observations of Variations in the X-Ray Flux from Cygnus X-1. *P. W. Sanford, K. O. Mason, F. J. Hawkins, P. Murdin, and A. Savage.* **190**, L55, 33-F7
- On the Interpretation of the He II $\lambda 4686$ Emission Line in HDE 226868 (Cygnus X-1). *G. F. Bisiacchi, D. Dultzin, C. Firmani, and S. Hacyan.* **190**, L59, 33-F11
- A New Measurement of the Hercules X-1 X-Ray Pulse Profile. *S. S. Holt, E. A. Boldt, R. E. Rothschild, J. L. R. Saba, and P. J. Serlemitsos.* **190**, L109, 37-F7
- Limits on Rapid X-Ray Pulsing in X-Ray Binaries. *G. Spada, H. Bradt, R. Doxsey, A. Levine, and S. Rappaport.* **190**, L113, 37-F10
- Optical Properties of HZ Herculis. *J. N. Bahcall, P. C. Joss, and Y. Avni.* **191**, 211, 41-A11
- A Spectroscopic Analysis of HZ Herculis. *David Crampton and J. B. Hutchings.* **191**, 483, 44-G7
- Disk-Accretion onto a Black Hole. I. Time-averaged Structure of Accretion Disk. *Don N. Page and Kip S. Thorne.* **191**, 499, 45-A9
- New High-Dispersion Radial-Velocity Curves of W Sagittarii. *Theodor S. Jacobsen.* **191**, 691, 47-G8
- He Emission in Cygnus X-1. *J. B. Hutchings, A. P. Cowley, D. Crampton, G. Fahrmann, J. W. Glaspey, and G. A. H. Walker.* **191**, 743, 48-D4
- Apсидal Motion and Period Changes in Centaurus X-3. *H.-C. Thomas.* **191**, L25, 42-B13
- Observation of an Absorption Dip in the X-Ray Intensity of Cygnus X-1. *Fuk Kwok Li and George W. Clark.* **191**, L27, 42-C1
- Observations of Circinus X-1 from Uhuru. *C. Jones, R. Giacconi, W. Forman, and H. Tananbaum.* **191**, L71, 46-B13
- OSO-7 Observations of Circinus X-1. *C. R. Canizares, F. K. Li, and G. W. Clark.* **191**, L75, 46-C3
- Evidence for the Existence of a Massive Companion to X Persei (=2U 0352+30?). *J. B. Hutchings, A. P. Cowley, D. Crampton, and R. O. Redman.* **191**, L101, 49-A2
- X-Ray Observations of the Large Magellanic Cloud by the Copernicus Satellite. *C. G. Rapple and I. R. Tuohy.* **191**, L113, 49-A13
- Analysis of the Blue Spectrum of the X-Ray Binary HD 153919. *J. B. Hutchings.* **192**, 677, 60-A6
- The X-Ray Binary HD 77581. *J. B. Hutchings.* **192**, 685, 60-A13
- X-Ray Absorption Events in Cygnus X-1 Observed with Copernicus. *Keith O. Mason, Frederick J. Hawkins, Peter W. Sanford, Paul Murdin, and Ann Savage.* **192**, L65, 57-E13
- Neutron Stars in Close Binary Systems. *J. Craig Wheeler, C. F. McKee, and M. Lecar.* **192**, L71, 57-F4
- Infrared Photometry of SS Cygni and RX Andromedae near Maximum. *Paula Szkody.* **192**, L75, 57-F8
- Infrared, Radio, and X-Ray Observations of Cygnus X-3. *E. E. Becklin, F. J. Hawkins, K. O. Mason, K. Matthews, G. Neugebauer, D. Packman, P. W. Sanford, B. Schupler, A. Stark, and C. G. Wynn-Williams.* **192**, L119, 61-E11
- On Changes in the Pulsation Period of Hercules X-1. *Kenneth Brecher and Ira Wasserman.* **192**, L125, 61-F7
- DQ Herculis: Weak Sister to HZ Herculis. *D. Q. Lamb.* **192**, L129, 61-F11
- The Identification and *UBV* Photometry of the Visible Compo-

Binaries — Continued

- nent of the Centaurus X-3 System. *W. Krzeminski*. **192**, L135, 61-G2
- Mass Limits for the Centaurus X-3 System. *Y. Avni and J. N. Bahcall*. **192**, L139, 61-G6
- DQ Herculis: Periodic Circular Polarization Synchronous with the Rapid Light Variations. *John B. Swedlund, James C. Kemp, and Ramon D. Woltencroft*. **193**, L11, 66-A12
- DQ Herculis: Periodic Linear Polarization Synchronous with the Rapid Light Variations. *James C. Kemp, John B. Swedlund, and Ramon D. Woltencroft*. **193**, L15, 66-B1
- On the Light Curves and Masses of the X-Ray Sources Cygnus X-1, SMC X-1, and Centaurus X-3. *J. B. Hutchings*. **193**, L61, 69-C7
- Rapid Light Variations of YZ Cancri: An Unusual SS Cygni Star. *Thomas J. Moffett and Thomas G. Barnes III*. **194**, 141, 75-D6
- Numerical Study of X-Ray Induced Mass Transfer in the HZ Herculis/Hercules X-1 Binary System. *Marvin L. Alme and James R. Wilson*. **194**, 147, 75-E1
- Time-dependent Accretion Disks around Compact Objects. I. Theory and Basic Equations. *Alan P. Lightman*. **194**, 419, 79-B13
- Time-dependent Accretion Disks around Compact Objects. II. Numerical Models and Instability of Inner Region. *Alan P. Lightman*. **194**, 429, 79-C8
- High-Dispersion Spectroscopic Observations of HD 77581, a Candidate for Vela XR-1(2U 0900-40). *George Wallerstein*. **194**, 451, 79-D14
- Limitations on the Masses and Other Dimensions of the Binary HD 77581. *David R. Mikkelsen and George Wallerstein*. **194**, 459, 79-E9
- A Study of an Early Flare, Radial Velocities, and Parallax Residuals for Possible Orbital Motion of HD 103095 (Groombridge 1830). *W. R. Beardsley, G. Gatewood, and K. W. Kamper*. **194**, 637, 83-A8
- The Apsidal-Motion Test for Models of Main-Sequence Stars. *Richard Stothers*. **194**, 651, 83-B11
- Are All Blue Stragglers Close Binaries? *Paul Hintzen, John Scott, and John Whelan*. **194**, 657, 83-C2
- The Structure of Synchronously Rotating Close Binaries Built on Polytropic Model $\nu = 3$. *Louis C. Green and Eleanor K. Kolchin*. **194**, 757, 84-B12; Suppl. **28**, 449 (No. 27)
- The Nearby Double Star G208-44/45. *R. S. Harrington, C. C. Dahn, and H. H. Guetter*. **194**, L87, 80-F12
- Speckle Interferometry. III. High-Resolution Measurements of Twelve Close Binary Systems. *A. Labeyrie, D. Bonneau, R. V. Stachnik, and D. Y. Gezari*. **194**, L147, 84-F5
- Black Holes**
- 2U 1700-37: Another Black Hole? *M. S. Bessell, B. A. Peterson, D. T. Wickramasinghe, and N. V. Vidal*. **187**, 355, 5-C10
- Black Holes in Binary Systems: Instability of Disk Accretion. *Alan P. Lightman and Douglas M. Eardley*. **187**, L1, 3-B2
- 2U 0900-40: A Black Hole? *D. T. Wickramasinghe, N. V. Vidal, M. S. Bessell, B. A. Peterson, and M. E. Perry*. **188**, 167, 11-F4
- A Theory of Galactic Nuclei and Quasi-stellar Objects. *Reuven Opher*. **188**, 201, 12-A13
- Accretion Flows in Galactic X-Ray Sources. I. Optically Thin Spherically Symmetric Model. *James Buff and Richard McCray*. **189**, 147, 20-D10
- Accretion onto Black Holes: The Emergent Radiation Spectrum. III. Rotating (Kerr) Black Holes. *Stuart L. Shapiro*. **189**, 343, 23-F12
- Millisecond Temporal Structure in Cygnus X-1. *R. E. Rothschild, E. A. Boldt, S. S. Holt, and P. J. Serlemitsos*. **189**, L13, 20-G11
- Multiple Star Systems and X-Ray Sources. *J. N. Bahcall, F. J. Dyson, J. I. Katz, and B. Paczyński*. **189**, L17, 21-A1
- Post-Newtonian Neutron Stars. *Robert V. Wagoner and Robert C. Malone*. **189**, L75, 24-F2
- Spectroscopic Observations of the Optical Companion to Cen-
- taurus X-3. *J. J. Rickard*. **189**, L113, 27-D1
- On the Interpretation of the He II $\lambda 4686$ Emission Line in HDE 226868 (Cygnus X-1). *G. F. Bisiacchi, D. Dultzin, C. Firmani, and S. Hacyan*. **190**, L59, 33-F11
- Energy Limits on the Penrose Process. *Robert M. Wald*. **191**, 231, 41-C2
- Disk-Accretion onto a Black Hole. I. Time-averaged Structure of Accretion Disk. *Don N. Page and Kip S. Thorne*. **191**, 499, 45-A9
- Disk-Accretion onto a Black Hole. II. Evolution of the Hole. *Kip S. Thorne*. **191**, 507, 45-B3
- Perturbation of a Slowly Rotating Black Hole by a Stationary Axisymmetric Ring of Matter. I. Equilibrium Configurations. *Clifford M. Will*. **191**, 521, 45-C2
- On the Variability of the Compact Nonthermal Sources. *James L. Elliot and Stuart L. Shapiro*. **192**, L3, 53-A4
- Can a Neutron Star Be Compressed into a Black Hole? *A. E. Hwang and John J. Dykla*. **192**, L141, 61-G8
- Black-Hole-Neutron-Star Collisions. *James M. Lattimer and David N. Schramm*. **192**, L145, 61-G11
- Perturbations of a Rotating Black Hole. III. Interaction of the Hole with Gravitational and Electromagnetic Radiation. *Saul A. Teukolsky and William H. Press*. **193**, 443, 68-D12
- Time-dependent Accretion Disks around Compact Objects. I. Theory and Basic Equations. *Alan P. Lightman*. **194**, 419, 79-B13
- Time-dependent Accretion Disks around Compact Objects. II. Numerical Models and Instability of Inner Region. *Alan P. Lightman*. **194**, 429, 79-C8
- Limitations on the Masses and Other Dimensions of the Binary HD 77581. *David R. Mikkelsen and George Wallerstein*. **194**, 459, 79-E9
- High-Dispersion Spectroscopic Observations of HD 77581, a Candidate for Vela XR-1(2U 0900-40). *George Wallerstein*. **194**, 451, 79-D14
- Ca II Emission**
- Measurements of Magnetic Fields in Young Main-Sequence Stars. *Ann Merchant Boesgaard*. **188**, 567, 17-B10
- The Age of Alpha Centauri. *Ann Merchant Boesgaard and Wendy Hagen*. **189**, 85, 19-G4
- Direct Observational Evidence for the Propagation and Dissipation of Energy in the Chromosphere. *Sou-Yang Liu*. **189**, 359, 24-A1
- Observations of the Profile of the Ca II Infrared Triplet Line $\lambda\lambda 4989$ in Late-Type Stars. *Christopher M. Anderson*. **190**, 585, 35-G6
- Stellar Model Chromospheres. II. Procyon (F5 IV-V). *Thomas R. Ayres, Jeffrey L. Linsky, and Richard A. Shine*. **192**, 93, 50-G7
- Calcium II K Emission in RT Aurigae. *D. R. Hollars*. **194**, 137, 75-D3
- Carbon Stars**
- Stellar Molecular Abundances. II. The Violet Depression in Carbon Stars. *Lee W. Hartmann and Joseph F. Dolan*. **187**, 151, 2-D11
- Carbon and Eruptive Stars: Surface Enrichment of Lithium, Carbon, Nitrogen, and ^{13}C by Deep Mixing. *J-Juliana Sacmann, Richard L. Smith, and Keith H. Despain*. **187**, 555, 8-C5
- Constraints on the Evolutionary History of Stars Showing s -processed Material. *Barry M. Schlesinger*. **188**, 141, 11-D8
- High-Resolution Spectra of Cool Stars in the 10- and 20-Micron Regions. *Richard Treffers and Martin Cohen*. **188**, 545, 17-A1
- Mean Absolute Magnitudes of Carbon Stars and Related Objects. *John H. Baumert*. **190**, 85, 28-G4
- On the C₂, CN, and CO Indices of Carbon Stars. *Theodore D. Fay, Jr.*. **190**, 597, 36-A4
- Near-Infrared Photometry of Unidentified IRC Stars. II. *G. W. Lockwood*. **192**, 113, 51-A12
- An Analysis of the CH Star HD 198269. *Paul Lee*. **192**, 133, 51-B13

- Further Observations of Stars in the Intermediate-Age Open Cluster NGC 2477. *F. D. A. Hartwick and James E. Hesser.* **192**, 391, 55-E7
- On a Possible Carbon-Star Member of the Old Open Cluster Trumpler 5. *J. Keith Kalinowski, Martin S. Burkhead, and R. Kent Honeycutt.* **193**, L77, 69-D8
- The Subgiant CH Stars. *Howard E. Bond.* **194**, 95, 75-A5
- Cataclysmic Stars: see Novae; U Geminorum Stars
- Celestial Mechanics
- The Gravitational Slingshot and the Structure of Extragalactic Radio Sources. *William C. Saslaw, Mauri J. Valtonen, and Sverre J. Aarseth.* **190**, 253, 31-A13
 - Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. III. The Page and Jenner Samples of Close Double Galaxies. *Herbert J. Rood.* **193**, 1, 63-A4
- Cepheids and W Virginis Stars
- Relativistic Terms in Nonlinear Pulsation Theory. *Cecil G. Davis.* **187**, 175, 2-F4
 - Multiple Solutions and Secular Stability of a $7 M_{\odot}$ Star with Core Helium and Shell Hydrogen Burning. *D. Lauterborn and R. Siquig.* **187**, 288, 4-F12
 - The Luminosities of Population II Cepheids. *Erika Böhm-Vitense.* **188**, 571, 17-B13
 - Period Variation of the Cepheid Zeta Geminorum. *Helmut A. Abt and Saul G. Levy.* **188**, L75, 15-F11
 - A Comparison of Variable and Nonvariable Stars in the Cepheid Strip. *Edward G. Schmidt, Jeffrey D. Rosenthal, and C. P. Jewsbury.* **189**, 293, 23-C5
 - Island Solutions in Linear Series of Static Stellar Models with Core Helium and Shell Hydrogen Burning for $M = 5, 7$, and $9 M_{\odot}$. *D. Lauterborn and R. A. Siquig.* **191**, 589, 45-G11
 - New High-Dispersion Radial-Velocity Curves of W Sagittarii. *Theodor S. Jacobsen.* **191**, 691, 47-G8
 - New Infrared Measurements of W Virginis Stars. *R. D. Gehrz and J. A. Hackwell.* **193**, 385, 67-G7
 - Advanced Evolution in Globular Clusters. I. The Ultraviolet-bright Stars in Eight Globular Clusters. *Robert Zinn.* **193**, 593, 70-G5
 - Masses and Luminosities of Population II Cepheids. *E. Böhm-Vitense, P. Szkody, G. Wallerstein, and Icko Iben, Jr.* **194**, 125, 75-C6
 - Calcium II K Emission in RT Aurigae. *D. R. Hollars.* **194**, 137, 75-D3
 - Steps toward the Hubble Constant. III. The Distance and Stellar Content of the M101 Group of Galaxies. *Allan Sandage and G. A. Tammann.* **194**, 223, 77-A12
- Chromospheres, Solar
- On Spatial Variations in the Intensity of Chromospheric H α . *K. B. Gebbie and R. Steinitz.* **188**, 399, 14-G6
 - Direct Observational Evidence for the Propagation and Dissipation of Energy in the Chromosphere. *Sou-Yang Liu.* **189**, 359, 24-A1
 - Research with Solar Satellites. *Leo Goldberg.* **191**, 1, 39-A4
 - Resonance-Line Transfer with Partial Redistribution. II. The Solar Mg II Lines. *R. W. Milkey and Dimitri Mihalas.* **192**, 769, 60-G8
 - The Small-Scale, Quasi-periodic, Disk Component of Solar Radio Radiation. *Kenneth R. Lang.* **192**, 777, 61-A2
 - Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount. *P. V. Foukal, M. C. E. Huber, R. W. Noyes, E. M. Reeves, E. J. Schmahl, J. G. Timothy, J. E. Vernazza, and G. L. Withbroe.* **193**, L143, 73-A10
 - A Simplified Method for Calculation of Radiative Energy Loss Due to Spectral Lines. *Richard C. Canfield.* **194**, 483, 79-G3
- Chromospheres, Stellar
- Stellar Model Chromospheres. II. Procyon (F5 IV-V). *Thomas R. Ayres, Jeffrey L. Linsky, and Richard A. Shine.* **192**, 93, 50-G7
- Circumstellar Shells
- A Model Envelope for the Shell Star 1 Delphini. *J. M. Marlborough and A. P. Cowley.* **187**, 99, 2-A4
- On the Problem of V1016 Cygni and the Evolutionary Stage of the Symbiotic Stars. *G. B. Baratta, A. Cassatella, and R. Viotti.* **187**, 651, 9-C1
- Pre-Main-Sequence Stars. III. Herbig Be/Ae Stars and Other Selected Objects. *Michel Breger.* **188**, 53, 10-D11
- Veiling and the Presence of Circumstellar Gas and Dust in Some Infrared Stars. *Roberta M. Humphreys.* **188**, 75, 10-F9
- Free-free and Free-bound Emission in Low-Surface-Gravity Stars. *Robert C. Gilman.* **188**, 87, 10-G13
- Infrared Variability of V1016 Cygni. *Paul M. Harvey.* **188**, 95, 11-A7
- Transfer of Resonance-Line Radiation in Differentially Expanding Atmospheres. III. Formation of P Cygni-Type Lines by a Doublet Line or Two Partially "Blended" Lines. *Thomas G. Hewitt and Peter D. Noerdlinger.* **188**, 315, 14-A8
- A Dust-Shell Model of the Infrared Object HD 45677. *John P. Apruzese.* **188**, 539, 16-G10
- High-Resolution Spectra of Cool Stars in the 10- and 20-Micron Regions. *Richard Treffers and Martin Cohen.* **188**, 545, 17-A1
- The Recent Shell Event of Zeta Ophiuchi. *Nelson J. Irvine.* **188**, L19, 12-D4
- Interpretation of Epsilon Aurigae. III. Study of the Light Curve Based on Disk Models. *Su-Shu Huang.* **189**, 485, 25-G10
- The Nature of Infrared Excesses in Extreme Be Stars. *Rudolph Schild, Frederic Chaffee, Jay A. Frogel, and S. Eric Persson.* **190**, 73, 28-F7
- 34-Micron Observations of Eta Carinae, G333.6-0.2, and the Galactic Center. *E. Sutton, E. E. Becklin, and G. Neugebauer.* **190**, L69, 33-G7
- A Quantitative Study of Silicate Extinction. *K. L. Day, T. R. Steyer, and D. R. Huffman.* **191**, 415, 44-B13
- The T Tauri Emission Nebula. *Richard D. Schwartz.* **191**, 419, 44-C3
- Time Variations in the OH Microwave and Infrared Emission from Late-Type Stars. *Paul M. Harvey, Kenneth P. Bechis, William J. Wilson, and John A. Ball.* **191**, 599, 46-A5; Suppl. 27, 331 (No. 248)
- Infrared Observations of Be Stars from 2.3 to 19.5 Microns. *R. D. Gehrz, J. A. Hackwell, and T. W. Jones.* **191**, 675, 47-F8
- A New Phenomenon in the Spectrum of Sigma Orionis E. *Nolan R. Walborn.* **191**, L95, 46-D9
- Angular Diameter of IRC+10011 at 2.2, 10, and 20 Microns. *R. R. Zappala, E. E. Becklin, K. Matthews, and G. Neugebauer.* **192**, 109, 51-A8
- Infrared Photometry of Wolf-Rayet Stars from 2.3 to 23 Microns. *J. A. Hackwell, R. D. Gehrz, and J. R. Smith.* **192**, 383, 55-D11
- Steady-State Mass Loss for Be Stars. *D. Nelson Limber.* **192**, 429, 56-A5
- The Dispersal of the Shell of Zeta Ophiuchi. *Paul K. Barker and Timothy Brown.* **192**, L11, 53-A12
- The Open Cluster NGC 7419 and its M7 Supergiant IRC +60 375. *William M. Fawley and Martin Cohen.* **193**, 367, 67-F3
- Nucleation and Growth of Dust Grains. *E. E. Salpeter.* **193**, 579, 70-F5
- Formation and Flow of Dust Grains in Cool Stellar Atmospheres. *E. E. Salpeter.* **193**, 585, 70-F11
- Planck Mean Cross-Sections for Four Grain Materials. *Robert C. Gilman.* **194**, 213, 76-B11; Suppl. 28, 397 (No. 268)
- Circumstellar Dust Emission from WC9 Stars. *R. D. Gehrz and J. A. Hackwell.* **194**, 619, 82-G4
- Cluster-Type Variables: see RR Lyrae Stars
- Clusters: see Globular Clusters; Open Clusters
- Collapsed Stars
- Type I Supernovae. *J. Craig Wheeler.* **187**, 337, 5-B5
 - Upper Limit on 2.5-Second Pulsations from Hercules X-1. *Y. Avni, J. N. Bahcall, P. C. Joss, E. Schreier, H. Tananbaum, and D. Q. Lamb.* **188**, L35, 15-D6
 - The Space-Time of Axisymmetric Gravitating Masses. *K. Y. Fu.* **190**, 411, 32-F2

Collapsed Stars — Continued

- Do OB Runaways Have Collapsed Companions? *Jacob D. Bekenstein and Richard L. Bowers*. **190**, 653, 36-E11
 A New Measurement of the Hercules X-1 X-Ray Pulse Profile. *S. S. Holt, E. A. Boldt, R. E. Rothschild, J. L. R. Saba, and P. J. Serlemitsos*. **190**, L109, 37-F7
 Observations of Circinus X-1 from Uhuru. *C. Jones, R. Giacconi, W. Forman, and H. Tananbaum*. **191**, L71, 46-B13
 Gravitational Radiation from Stellar Collapse. *T. X. Thuan and J. P. Ostriker*. **191**, L105, 49-A6

Combination Spectra

- On the Problem of V1016 Cygni and the Evolutionary Stage of the Symbiotic Stars. *G. B. Baratta, A. Cassatella, and R. Viotti*. **187**, 651, 9-C1
 Models of Asymptotic-Giant-Branch Stars. *P. R. Wood*. **190**, 609, 36-B1

Comets

- Detection of OH at 18-Centimeter Wavelength in Comet Kohoutek (1973f). *B. E. Turner*. **189**, L137, 27-E9
 Infrared Observations of Comet Kohoutek near Perihelion. *Edward P. Ney*. **189**, L141, 27-E12
 Identification of H_2O^+ in the Tail of Comet Kohoutek (1973f). *P. A. Wehinger, S. Wyckoff, G. H. Herbig, G. Herzberg, and H. Lew*. **190**, L43, 30-G6
 Are Stellar Surface Heavy-Element Abundances Systematically Enhanced? *Paul C. Joss*. **191**, 771, 48-F1
 Radiofrequency Emission from CH in Comet Kohoutek (1973f). *J. H. Black, E. J. Chaisson, J. A. Ball, H. Penfield, and A. E. Lilley*. **191**, L45, 42-D3
 Ultraviolet Fluorescent Pumping of OH 18-Centimeter Radiation in Comets. *Frederick H. Mies*. **191**, L145, 49-C13
 H_2O^+ in Spectra of Comet Bradfield (1974b). *P. Wehinger and S. Wyckoff*. **192**, L41, 53-C10
 Interstellar Molecules: Origin by Catalytic Reactions on Grain Surfaces? *Edward Anders, Ryoichi Hayatsu, and Martin H. Studier*. **192**, L101, 58-A5
 Cometary Comet Ions. *A. C. Aikin*. **193**, 263, 65-E7
 The $^{12}\text{C}/^{13}\text{C}$ Ratio in Comet Kohoutek (1973f). *A. C. Danks, D. L. Lambert, and C. Arpigny*. **194**, 745, 84-B1

Convection

- The Oxygen Abundance in the Metal-deficient Star HD 122563. *D. L. Lambert, C. Sneden, and L. M. Ries*. **188**, 97, 11-A9
 Metallicity in Border Regions of the Am Domain. III. Analysis of the Hot Stars Alpha Geminorum A and B and Theta Leonis. *Myron A. Smith*. **189**, 101, 20-A7
 Do Helium-Shell Flashes Cause Extensive Mixing in Low-Mass Stars? *Allen V. Sweigart*. **189**, 289, 23-C2
 Horizontal-Branch Evolution with Semiconvection. I. Interior Evolution. *Allen V. Sweigart and Peter G. Gross*. **190**, 101, 29-A7
 The Differential Rotation of the Solar Surface. *Peter J. Giersch*. **190**, 199, 30-A2
 Convective Overshoot Mixing in Old Open Clusters. *M. J. Prather and P. Demarque*. **193**, 109, 64-A12
 Rigid and Differential Rotation Driven by Oscillations within the Sun. *Charles L. Wolff*. **194**, 489, 80-A2
 The Gap in the Two-Color Diagram of Main-Sequence Stars. *E. Böhm-Vitense and R. Canterra*. **194**, 629, 83-A1
 CNO Tri-cycling as an ^{17}O Enrichment Mechanism. *David Dearborn and David N. Schramm*. **194**, L67, 80-E6

Cool Stars: see Late-Type Stars**Corona, Solar**

- The Outer Solar Corona as Observed from *Skylab*: Preliminary Results. *R. M. MacQueen, J. A. Eddy, J. T. Gosling, E. Hildner, R. H. Munro, G. A. Newkirk, Jr., A. I. Poland, and C. L. Ross*. **187**, L85, 6-D7
 Relative Coronal Abundances Derived from X-Ray Observations. I. Sodium, Magnesium, Aluminum, Silicon, Sulfur, and Argon. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **188**, 423, 15-B9
 Solar Coronal Line Profiles in the Extreme-Ultraviolet. *U. Feldman and W. E. Behring*. **189**, L45, 21-C1

- Stabilization of Electron Streams in Type III Solar Radio Bursts. *Konstantinos Papadopoulos, Melvyn L. Goldstein, and Robert A. Smith*. **190**, 175, 29-F7

- A New Theory of Coronal Heating. *Randolph H. Levine*. **190**, 457, 33-B8

- Research with Solar Satellites. *Leo Goldberg*. **191**, 1, 39-A4
 Relative Coronal Abundances Derived from X-Ray Observations. II. Nitrogen, Oxygen, Neon, Magnesium, and Iron. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **192**, 169, 51-E5

- Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount. *P. V. Foukal, M. C. E. Huber, R. W. Noyes, E. M. Reeves, E. J. Schmahl, J. G. Timothy, J. E. Vernazza, and G. L. Withbroe*. **193**, L143, 73-A10

- Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from *Skylab*. *Martin C. E. Huber, P. V. Foukal, R. W. Noyes, E. M. Reeves, E. J. Schmahl, J. G. Timothy, J. E. Vernazza, and G. L. Withbroe*. **194**, L115, 81-B2

Coronae, Stellar

- Evidence for a Corona of Beta Geminorum. *Humberto Gerola, Jeffrey L. Linsky, Richard Shine, W. McClintock, R. C. Henry, and H. W. Moos*. **193**, L107, 72-F1

- A Search for Soft X-Ray Emission from Red-Giant Coronae. *Bruce Margon, Keith O. Mason, and Peter W. Sanford*. **194**, L75, 80-F1

Coronal Lines

- Relative Coronal Abundances Derived from X-Ray Observations. I. Sodium, Magnesium, Aluminum, Silicon, Sulfur, and Argon. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **188**, 423, 15-B9

- Relative Coronal Abundances Derived from X-Ray Observations. II. Nitrogen, Oxygen, Neon, Magnesium, and Iron. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **192**, 169, 51-E5

- Relative Coronal Abundances Derived from X-Ray Observations. III. The Effect of Cascades on the Relative Intensity of Fe XVII Line Fluxes, and a Revised Iron Abundance. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **194**, 471, 79-F5

- On the Fe XXIV Emission in the Solar Flare of 1973 June 15. *Kenneth G. Widmer and Chung-Chieh Cheng*. **194**, L111, 81-A8

- Forbidden-Line Excitation Data for Certain Coronal Lines. *S. J. Czyzak, L. H. Aller, and R. N. Euwema*. **195**, 251, 3-D6; Suppl. **28**, 465 (No. 272)

Cosmic Background Radiation

- A Search for Isolated Radiofrequency Pulses. *G. R. Huguenin and E. L. Moore*. **187**, L57, 6-B9

- The Small-Scale Anisotropy of the Cosmic Light. *Stephen A. Shectman*. **188**, 233, 13-B12

- Multiple Inverse Compton Scattering and the Diffuse X-Ray Component. *A. Bui-Van and K. Hurley*. **188**, L51, 15-E6

- Turbulence-enhanced Synchrotron Radiation in the Galaxy. *R. Cowisk and J. Mitteldorf*. **189**, 51, 19-D12

- Cosmic Background Radiation at 1.32 Millimeters. *D. J. Hegyi, W. A. Traub, and N. P. Carleton*. **190**, 543, 35-D8

- Energy Spectrum and Evidence for Extragalactic Origin of Diffuse Gamma-Radiation in the MeV Range. *V. Schönfelder and G. Lichten*. **191**, L1, 42-A2

- A Search for a Cosmological Component of the Soft-X-Ray Background in the Direction of M31. *Bruce Margon, Stuart Bowyer, Ray Crudace, Carl Heiles, Michael Lampton, and Thomas Troland*. **191**, L117, 49-B3

- The Primordial Generation of Random Shear Motions and Small-Scale Angular Anisotropy in the Microwave Background Radiation. *Joseph Silk*. **194**, 215, 77-A4

- The Effect of Repeated Compton Scatterings on the Diffuse X-Ray Background. *James E. Felten and Robert J. Gould*. **194**, L39, 76-E12

- Can the Constraint of Finite Mass Smooth Fluctuations in the Background Radiation? *Daniel A. Schwartz*. **194**, L139, 84-A11

Cosmic Rays

- Observation of Gamma-Radiation from the Galactic Center Region. *G. H. Share, R. L. Kinzer, and N. Seeman.* **187**, 45, 1-D1
- Solar Cosmic-Ray Acceleration by a Plasma Instability. *Peter S. Gray.* **187**, 195, 2-G6
- Do Cosmic Rays Heat HZ Herculis? *K. Brecher and P. Morrison.* **187**, 349, 5-C5
- Cosmic Gamma-Ray Burst Detected with an Instrument on Board the OGO-5 Satellite. *Jacques L'Heureux.* **187**, L53, 6-B5
- Cosmic Gamma-Ray Bursts from Relativistic Dust Grains. *Jonathan E. Grindlay and G. G. Fazio.* **187**, L93, 9-D2
- Cosmic Gamma-Ray Bursts from Directed Stellar Flares. *K. Brecher and P. Morrison.* **187**, L97, 9-D6
- The Anomalous Abundance of Cosmic-Ray Nitrogen and Oxygen Nuclei at Low Energies. *F. B. McDonald, B. J. Teegarden, J. H. Trainor, and W. R. Webber.* **187**, L105, 9-D12
- Coherent Propagation of Charged-Particle Bunches in Random Magnetic Fields. *James A. Earl.* **188**, 379, 14-F1
- Possible Evidence for Structured Acceleration of Cosmic Rays on a Galactic Scale from Recent γ -Ray Observations. *F. W. Stecker, J. L. Puget, A. W. Strong, and J. H. Bredekamp.* **188**, L59, 15-E13
- On Ionization in H I Regions. *L. M. Hobbs.* **188**, L107, 18-E3
- Turbulence-enhanced Synchrotron Radiation in the Galaxy. *R. Cowik and J. Mitteldorf.* **189**, 51, 19-D12
- The Fokker-Planck Coefficient for Pitch-Angle Scattering of Cosmic Rays. *L. A. Fisk, M. L. Goldstein, A. J. Klimas, and G. Sandri.* **190**, 417, 32-F7
- Observation of Trans-Iron Solar-Flare Nuclei in an *Apollo 16* Command Module Window. *E. K. Shirk.* **190**, 695, 37-A12
- Anomalies in the Composition of Interplanetary Heavy Ions with $0.01 < E < 40$ MeV per amu. *J. H. Chan and P. B. Price.* **190**, L39, 30-G3
- Ionization Mechanisms of the Intercloud Medium. *P. Mészáros.* **191**, 79, 39-G4
- Upper Limits to the Flux of Cosmic Rays and X-Rays in Interstellar Clouds. *Edward J. O'Donnell and William D. Watson.* **191**, 89, 40-A1
- The Effects of Nonlinear Terms in Cosmic-Ray Diffusion Theory. *A. J. Owens.* **191**, 235, 41-C5
- The Distribution of Cosmic Rays in the Galaxy and their Dynamics as Deduced from Recent γ -Ray Observations. *J. L. Puget and F. W. Stecker.* **191**, 323, 34-C7
- Charge Composition and Energy Spectra of Cosmic-Ray Nuclei at Energies above 20 GeV per Nucleon. *Einar Juliusson.* **191**, 331, 43-C14
- Nucleosynthesis in White-Dwarf Atmospheres. *Fred Hoyle and Donald D. Clayton.* **191**, 705, 48-A4
- Cosmic-Ray Streaming Perpendicular to the Mean Magnetic Field. *M. A. Forman, J. R. Jokipii, and A. J. Owens.* **192**, 535, 57-A10
- The Energy Spectrum of 0.16 to 2 MeV Electrons during Solar Quiet Times. *G. J. Hurford, R. A. Mewaldt, E. C. Stone, and R. E. Vogt.* **192**, 541, 57-B2
- Rigidity Spectrum of $Z \geq 3$ Cosmic-Ray Nuclei in the Range 4-285 GV and a Search for Cosmic Antimatter. *R. L. Golden, J. H. Adams, Jr., C. L. Deney, G. D. Badhwar, T. M. K. Marar, H. H. Heckman, and P. J. Lindstrom.* **192**, 747, 60-F3
- Monte Carlo Analysis of the Solar-Wind Modulation of Galactic C-N-O at Solar Maximum. *T. A. Moss and R. T. Giuli.* **192**, 753, 60-F8
- The Diffusive Idealization of Charged-Particle Transport in Random Magnetic Fields. *James A. Earl.* **193**, 231, 65-C4
- Composition of Heavy Cosmic Rays from 25 to 180 MeV Per Atomic Mass Unit. *R. L. Fleischer, H. R. Hart, Jr., and A. Renshaw.* **193**, 575, 70-F2
- Do Supernova Remnants Provide the Cosmic-Ray Electrons? *John R. Dickel.* **193**, 755, 72-E1
- Pitch-Angle Scattering of Charged Particles in a Random

Magnetic Field. *J. R. Jokipii.* **194**, 465, 79-E14

Cosmology

- A Time-symmetric, Matter, Antimatter, Tachyon Cosmology. *J. Richard Gott III.* **187**, 1, 1-A3
- Formation of Galaxies and Clusters of Galaxies by Self-similar Gravitational Condensation. *William H. Press and Paul Schechter.* **187**, 425, 7-A3
- The Small-Scale Anisotropy of the Cosmic Light. *Stephen A. Shectman.* **188**, 233, 13-B12
- The Hubble Relation for Nonstandard Candles and the Origin of the Redshift of Quasars. *Vahé Petrosian.* **188**, 443, 16-A3
- Observations in Locally Inhomogeneous Cosmological Models. *C. C. Dyer and R. C. Roeder.* **189**, 167, 22-A4
- Charged Cosmology. *George W. Barry.* **190**, 279, 31-C13
- Can Supernovae Produce Deuterium? *Richard I. Epstein, W. David Arnett, and David N. Schramm.* **190**, L13, 30-E3
- Dynamical Analysis of Brans-Dicke Cosmologies. *R. E. Morganstern.* **191**, 39, 39-C9
- A Search for Primeval Galaxies at High Redshifts. *R. B. Partridge.* **192**, 241, 54-A4
- Search for Primeval Galaxies. *Marc Davis and David T. Wilkinson.* **192**, 251, 54-A13
- Cosmological Parameters for a Restricted Class of Closed Big-Bang Universes. *P. T. Landsberg and R. K. Pathria.* **192**, 577, 59-A4
- Distances to Extragalactic Supernovae. *Robert P. Kirshner and John Kwan.* **193**, 27, 63-C1
- Further Observations at the Interstellar Deuterium Frequency. *Jay M. Pasachoff and Diego A. Cesarsky.* **193**, 65, 63-E13
- Chemical Composition of H II Regions in the Large Magellanic Cloud and Its Cosmological Implications. *Manuel Peimbert and Silvia Torres-Peimbert.* **193**, 327, 67-C8
- Optical Spectra and Redshifts of 4C Quasi-stellar Radio Sources. *Maarten Schmidt.* **193**, 505, 70-A4
- Large-Scale Inhomogeneity of the Universe: Implications for the Deceleration Parameter. *Joseph Silk.* **193**, 525, 70-B11
- The Size and Mass of Galaxies, and the Mass of the Universe. *J. P. Ostriker, P. J. E. Peebles, and A. Yahil.* **193**, L1, 66-A2
- An Unbound Universe? *J. Richard Gott III, James E. Gunn, David N. Schramm, and Beatrice M. Tinsley.* **194**, 543, 82-A4
- Galaxy Counts as a Cosmological Test. *G. Stanley Brown and Beatrice M. Tinsley.* **194**, 555, 82-B1
- Steps toward the Hubble Constant. IV. Distances to 39 Galaxies in the General Field Leading to a Calibration of the Galaxy Luminosity Classes and a First Hint of the Value of H_0 . *Allen Sandage and G. A. Tammann.* **194**, 559, 82-B5
- Crab Nebula**
- Effect of Faraday Rotation on the Circular Polarization of the Crab Nebula. *Michael J. Gerver.* **189**, 249, 22-F13
- Spectrophotometry of the Crab Nebula. *Robert P. Kirshner.* **194**, 323, 78-B12
- A Study of Birefringence in the Interstellar Medium in the Direction of the Crab Nebula. *P. G. Martin and J. R. P. Angel.* **193**, 343, 67-D9
- Uhuru Observations of Short-Time-Scale Variations of the Crab. *W. Forman, R. Giacconi, C. Jones, E. Schreier, and H. Tananbaum.* **193**, L67, 69-C12
- The Crab Nebula Pulsar: Radiofrequency Spectral Variability. *John M. Rankin, R. R. Payne, and D. B. Campbell.* **193**, L71, 69-D2
- Deuterium**
- Search for Deuterium in Orion and Detection of High-Velocity Features. *W. A. Traub, N. P. Carleton, and D. J. Hegyi.* **190**, L81, 34-A4
- Dissipation in Supernova Shock Waves. *T. A. Weaver and G. F. Chapline.* **192**, L57, 57-E6
- A New DCN Line: DCN(HCN) Excitation. *T. G. Phillips, K. B. Jefferts, and P. G. Wannier.* **192**, L153, 62-A5
- Double Stars: see Visual Double or Multiple Stars
- Dwarf Novae

Dwarf Novae — Continued

Possible Detection of Very Soft X-Rays from SS Cygni. *S. Rappaport, W. Cash, R. Doxsey, J. McClintock, and G. Moore.* **187**, L5, 3-B5

Infrared Photometry of SS Cygni and RX Andromedae near Maximum. *Paula Szkody.* **192**, L75, 57-F8

Ultraviolet Detection of the Dwarf Nova SS Cygni. *Albert V. Holm and John S. Gallagher III.* **192**, 425, 56-A1

CNO Abundances and Hydrodynamic Models of the Nova Outburst. III. $0.5 M_{\odot}$ Models with Enhanced Carbon, Oxygen, and Nitrogen. *Summer Starrfield, Warren M. Sparks, and James W. Truran.* **192**, 647, 59-F5

The Mass of the Dwarf Nova EM Cygni. *Edward L. Robinson.* **193**, 191, 64-G10

Rapid Light Variations of YZ Cancri: An Unusual SS Cygni Star. *Thomas J. Moffett and Thomas G. Barnes III.* **194**, 141, 75-D6

Early-Type Stars

Orbital Elements and Absolute Dimensions of the Eclipsing System LY Aurigae. *George E. McCluskey, Jr., and Yoji Kondo.* **187**, 93, 1-G12

The Composition and Evolutionary Status of the Helium-rich Stars. *Patrick S. Osmer and Deane M. Peterson.* **187**, 117, 2-B6

Spectroscopic Studies of O-Type Stars. IV. Lines in the Red Region. *Peter S. Conti.* **187**, 539, 8-B4

Emission Lines in the Spectrum of Zeta Ophiuchi. *Virpi S. Niemelä and Roberto H. Méndez.* **187**, L23, 3-C5

A Broad Absorption Region in the Ultraviolet Spectra of Early-Type Stars. *G. I. Thompson, C. M. Humphries, and K. Nandy.* **187**, L81, 6-D3

NGC 2287 and the Pleiades Group. *O. J. Egeen.* **188**, 59, 10-E3

Reinvestigation of Certain Long-Period A-Type Variables. *Helmut A. Abt and Saul G. Levy.* **188**, 291, 13-F13

Rediscussion of Eclipsing Binaries. X. The B Stars AG Persei and CW Cassiopeiae. *Daniel M. Popper.* **188**, 559, 17-B3

$\text{He I} \lambda 4471$ Profiles in B Stars: Calculations with an Improved Line-broadening Theory. *Dimitri Mihalas, A. J. Barnard, J. Cooper, and E. W. Smith.* **190**, 315, 31-F6

Four-Color Observations of Early-Type Stars. IV. South Galactic Pole. *A. G. Davis Philip.* **190**, 573, 35-F10

Do OB Runaways Have Collapsed Companions? *Jacob D. Bekenstein and Richard L. Bowers.* **190**, 653, 36-E11

Optical Observations of HD 77581 and a Model for the System HD 77581-2U 0900-40. *Larry D. Petro and W. A. Hiltner.* **190**, 661, 36-F7

Ionization of the Low-Density Interstellar Medium. *S. Torres-Peimbert, A. Lazcano-Araujo, and M. Peimbert.* **191**, 401, 44-A12

The Ultraviolet Spectrum of Eta Canis Majoris, B5 Ia. *Anne B. Underhill.* **191**, 601, 46-A6; Suppl. 27, 359 (No. 249)

Ultraviolet Photometry from the Orbiting Astronomical Observatory. XVI. The Stellar Lyman- α Absorption Line. *Blair D. Savage and Robert J. Panek.* **191**, 659, 47-E5

A New Phenomenon in the Spectrum of Sigma Orionis. *E. Nolan R. Walborn.* **191**, L95, 46-D9

Rotational Velocities of A0 Stars. *Michael M. Dworetsky.* **192**, 574, 57-D6; Suppl. 28, 101 (No. 256)

The X-Ray Binary HD 77581. *J. B. Hutchings.* **192**, 685, 60-A13

Ultraviolet Television Data from the Orbiting Astronomical Observatory. II. Stellar Ultraviolet Colors and Interstellar Extinction. *Eric Peyremann and Robert J. Davis.* **192**, 815, 61-C12; Suppl. 28, 211 (No. 260)

The Dispersal of the Shell of Zeta Ophiuchi. *Paul K. Barker and Timothy Brown.* **192**, L11, 53-A12

Spectroscopic Observations of O-Type Stars. V. The Hydrogen Lines and $\lambda 4686$ He II. *Peter S. Conti and Eva M. Leep.* **193**, 113, 64-B2

Theory of Extended Stellar Atmospheres. I. Computational Method and First Results for Static Spherical Models. *Dimitri Mihalas and D. G. Hummer.* **193**, 503, 69-B1; Suppl. 28, 343 (No. 265)

Rocket-Ultraviolet Spectra of Kappa, Lambda, Tau, and Upsilon Scorpii. *Edward B. Jenkins, Donald C. Morton, and Donald G. York.* **194**, 77, 74-G1

Neutral Helium Line Strengths. VII. The Population II B Star Barnard 29 in M13. *L. H. Auer and John Norris.* **194**, 87, 74-G12

Eclipsing Binaries

Interpretation of Epsilon Aurigae. II. Infrared Excess, Secondary Light Variations, and Plausible Formation of a Planetary System. *Su-Shu Huang.* **187**, 87, 1-G6

Orbital Elements and Absolute Dimensions of the Eclipsing System LY Aurigae. *George E. McCluskey, Jr., and Yoji Kondo.* **187**, 93, 1-G12

Extended Observations of >7 keV X-Rays from Centaurus X-3 by the OSO-7 Satellite. *W. A. Baily, M. P. Ulmer, W. A. Wheaton, and L. E. Peterson.* **187**, 341, 5-B9

Ultraviolet Photometry from the Orbiting Astronomical Observatory. XI. The 1971 Eclipse of 32 Cygni. *L. R. Doherty, J. F. McNall, and A. V. Holm.* **187**, 521, 8-A1

Rediscussion of Eclipsing Binaries. X. The B Stars AG Persei and CW Cassiopeiae. *Daniel M. Popper.* **188**, 559, 17-B3

The Secondary Component of Beta Lyrae. *Robert E. Wilson.* **189**, 319, 23-E4

Interpretation of Epsilon Aurigae. III. Study of the Light Curve Based on Disk Models. *Su-Shu Huang.* **189**, 485, 25-G10

Complex Infrared Emission Features in the Spectrum of Beta Lyrae. *T. H. Morgan, A. E. Potter, and Y. Kondo.* **190**, 349, 32-A12

Coherent Oscillations in UX Ursae Majoris. *R. Edward Nather and E. L. Robinson.* **190**, 637, 36-D7

The Mass of the Dwarf Nova EM Cygni. *Edward L. Robinson.* **193**, 191, 64-G10

A Spectroscopic Study of YY Geminorum. *Bernard W. Bopp.* **193**, 389, 67-G11

Elementary Particles

A Theory of Galactic Nuclei and Quasi-stellar Objects. *Reuven Opher.* **188**, 201, 12-A13

Solar Neutrinos and the Behavior of the Fermi Coupling Constant. *Arrigo Finzi.* **189**, 157, 20-E5

Emission-Line Stars

Emission Lines in the Spectrum of Zeta Ophiuchi. *Virpi S. Niemelä and Roberto H. Méndez.* **187**, L23, 3-C5

Pre-Main-Sequence Stars. III. Herbig Be/Ae Stars and Other Selected Objects. *Michel Breger.* **188**, 53, 10-D11

Infrared Variability of V1016 Cygni. *Paul M. Harvey.* **188**, 95, 11-A7

Photoelectric and Spectroscopic Observations of WRA 795. *N. V. Vidal, D. T. Wickramasinghe, B. A. Peterson, and M. S. Bessell.* **188**, 163, 11-E13

A Search for Lyman-Alpha Emission in Beta Lyrae from *Copernicus*. *Yoji Kondo and George E. McCluskey, Jr.* **188**, L63, 15-F2

The Age of Alpha Centauri. *Ann Merchant Boesgaard and Wendy Hagen.* **189**, 85, 19-G4

Complex Infrared Emission Features in the Spectrum of Beta Lyrae. *T. H. Morgan, A. E. Potter, and Y. Kondo.* **190**, 349, 32-A12

The V1057 Cygni OH Source: Time Variation, Polarization Properties, and Accurate Position. *K. Y. Lo and Kenneth P. Beckis.* **190**, L125, 37-G5

Variations of the Emission Line Profiles in the O6ef Star Lambda Cephei. *Peter S. Conti and Stewart A. Frost.* **190**, L137, 38-A1

Fe I Fluorescence in T Tauri Stars. *L. A. Willson.* **191**, 143, 40-D4

H Alpha Emission in Cygnus X-1. *J. B. Hutchings, A. P. Cowley, D. Crampton, G. Fahrmann, J. W. Glaspey, and G. A. H. Walker.* **191**, 743, 48-D4

Optical Polarization of Selected Herbig-Haro Objects. *K. M. Strom, S. E. Strom, and T. D. Kinman.* **191**, L93, 46-D6

Spectroscopic Observations of O-Type Stars. V. The Hydrogen

- Line and $\lambda 4686$ He II. *Peter S. Conti and Eva M. Leep.* **193**, 113, 64-B2
- Equations:** see **Functions**
- Equation of State**
- Anisotropic Spheres in General Relativity. *Richard L. Bowers and E. P. T. Liang.* **188**, 657, 18-B3
- Deuterium Enrichment of Metallic Hydrogen. *W. B. Hubbard.* **190**, 223, 30-B11
- Correlation Effects on the Energy Shifts of Excited Nucleons in Neutron-Star Matter. *A. Nandy.* **190**, 385, 32-D5
- Structure of Solid Iron in Superstrong Neutron-Star Magnetic Fields. *Hsing-Hen Chen, Malvin A. Ruderman, and Peter G. Sutherland.* **191**, 473, 44-F13
- Excitation and Ionization:** see **Atomic Processes**
- f-Values:** see **Transition Probabilities**
- Faculae, Solar**
- Faculae and the Solar Oblateness. II. *R. H. Dicke.* **190**, 187, 29-G4
- The Oblateness of the Sun. *R. H. Dicke and H. Mark Goldberg.* **190**, 507, 33-E9; Suppl. **27**, 131 (No. 241)
- Faint Blue Stars**
- The Nature of Faint Blue Stars in the Halo. II. *Jesse L. Greenstein and Anneila I. Sargent.* **192**, 813, 61-C11; Suppl. **28**, 157 (No. 259)
- Flare Stars**
- Cosmic Gamma-Ray Bursts from Directed Stellar Flares. *K. Brecher and P. Morrison.* **187**, L97, 9-D6
- The Coalsack. II. Photometry of Suspected Flare Stars. *Wm. Bruce Weaver.* **189**, 81, 19-G1
- The Age of Alpha Centauri. *Ann Merchant Boesgaard and Wendy Hagen.* **189**, 85, 19-G4
- Three-Color Photometry of the Flare Star EV Lacertae. *T. R. Flesch and J. P. Oliver.* **189**, L127, 27-E1
- Short-Duration Radio Flares of UV Ceti Stars. *Steven R. Spangler, Stanley D. Shawhan, and John M. Rankin.* **190**, L129, 37-G9
- Starspots on Flare Stars. *D. J. Mullan.* **192**, 149, 51-D1
- A Spectroscopic Study of YY Geminorum. *Bernard W. Bopp.* **193**, 389, 67-G11
- A Study of an Early Flare, Radial Velocities, and Parallax Residuals for Possible Orbital Motion of HD 103095 (Groombridge 1830). *W. R. Beardsley, G. Gatewood, and K. W. Kamper.* **194**, 637, 83-A8
- Four-Stokes-Parameter Radiofrequency Polarimetry of a Flare from AD Leonis. *Steven R. Spangler, John M. Rankin, and Stanley D. Shawhan.* **194**, L43, 76-F2
- Flares, Solar**
- Solar Cosmic-Ray Acceleration by a Plasma Instability. *S. Peter Gray.* **187**, 195, 2-G6
- A Theoretical and Experimental Study of Fe XIX to Fe XXIV Solar-Flare Spectra and Isoelectronic Spectra in Sulfur. *B. C. Fawcett, R. D. Cowan, and R. W. Hayes.* **187**, 377, 5-E3
- Laser-Plasma Spectra of Highly Ionized Fluorine. *U. Feldman, G. A. Doschek, D. J. Nagel, W. E. Behring, and R. D. Cowan.* **187**, 417, 5-G11
- Coherent Propagation of Charged-Particle Bunches in Random Magnetic Fields. *James A. Earl.* **188**, 379, 14-F1
- Resistive Diffusion of Force-free Magnetic Fields in a Passive Medium. III. Acceleration of Flare Particles. *B. C. Low.* **189**, 353, 23-G7
- Solar-Flare and Laboratory Plasma Phenomena. *Tong Nyong Lee.* **190**, 467, 33-C3
- Observation of Trans-Iron Solar-Flare Nuclei in an Apollo 16 Command Module Window. *E. K. Shirk.* **190**, 695, 37-A12
- Dynamics of the Solar Magnetic Field. III. Location of Solar-Flare Excitation and the Velocity Field Determined from Magnetograms. *Randolph H. Levine and Y. Nakagawa.* **190**, 703, 37-B6
- Solar-Flare Emission Lines in the Range from 66 to 171 Å; $2s^2p^{k-2}3s^12p^{k+1}$ Transitions in Highly Ionized Iron. *S. O.*
- Kastner, W. M. Neupert, and M. Swartz.* **191**, 261, 41-E3
- Rise Time in 20-32 keV Impulsive X-Radiation. *Joan A. Vorpahl and Tatsuo Takakura.* **191**, 563, 45-E13
- 478-keV and 431-keV Line Emissions from Alpha-Alpha Reactions. *B. Kozlovsky and R. Ramaty.* **191**, L43, 42-D1
- Resistive Diffusion of Force-free Magnetic Fields in a Passive Medium. IV. The Dynamical Theory. *B. C. Low.* **193**, 243, 65-D2
- A Simplified Method for Calculation of Radiative Energy Loss Due to Spectral Lines. *Richard C. Canfield.* **194**, 483, 79-G3
- On the Fe XXIV Emission in the Solar Flare of 1973 June 15. *Kenneth G. Widgren and Chung-Chieh Cheng.* **194**, L111, 81-A8
- Forbidden Lines**
- Analysis of the Solar Magnesium I Spectrum. *Richard C. Alcock and Richard C. Canfield.* **194**, 733, 84-A3
- Functions**
- A Note on Summing Series of Bessel Functions Occurring in Certain Plasma Astrophysical Situations. I. *Lerche.* **190**, 165, 29-E12
- An Exact Expression for the Temperature Structure of a Homogeneous Planetary Atmosphere Containing Isotropic Scatterers. *Bruce R. Barkstrom.* **190**, 225, 30-B13
- Formation of Coupled Spectral Lines in a Planetary Atmosphere. *J. W. Chamberlain and L. Wallace.* **190**, 487, 33-D7
- Galactic Nuclei**
- Observations of the Infrared Radiation from the Nuclei of NGC 1068 and NGC 4151. *W. A. Stein, F. C. Gillett, and K. M. Merrill.* **187**, 213, 4-A3
- On the Nuclear Motions in NGC 4151. *Kurt S. Anderson.* **187**, 445, 7-B10
- The Starlike Nucleus of NGC 6207. *D. W. Weedman and R. F. Carswell.* **188**, 1, 10-A4
- The Motions in the Central Region of NGC 4736: Evidence for an Expanding Ring. *P. C. van der Kruit.* **188**, 3, 10-A6
- A High-Resolution Map of the Galactic-Center Region. *J. E. Kapitzky and W. A. Dent.* **188**, 27, 10-B13
- A Search for OD in the Galactic Center. *Mark Allen, Diego A. Cesarsky, and Richard M. Crutcher.* **188**, 33, 10-C5
- A Theory of Galactic Nuclei and Quasi-stellar Objects. *Reuven Opher.* **188**, 201, 12-A13
- Helium Abundance at the Galactic Center. *M. Jura and E. L. Wright.* **188**, 473, 16-C2
- Optical Interstellar Line Studies of a Nearby Cold Cloud. *Richard M. Crutcher and Kurt W. Riegel.* **188**, 481, 16-C10
- The Possible Relation of the 3-Kiloparsec Arm to Explosions in the Galactic Nucleus. *R. H. Sanders and K. H. Prendergast.* **188**, 489, 16-D4
- Infrared Polarization of the Galactic Nucleus. *H. M. Dyck, R. W. Capps, and C. A. Beichman.* **188**, L103, 18-D13
- The Southern Seyfert Galaxies NGC 1566 and NGC 3783. *Patrick S. Osmer, Malcolm G. Smith, and Daniel W. Weedman.* **189**, 187, 22-B8
- A Blue Galactic Nucleus with a Featureless Spectrum. *E. Ye. Khachikian and D. W. Weedman.* **189**, L99, 27-C1
- On the Stellar Content and Reddening in the Nucleus of NGC 5195. *John W. Warner.* **190**, 28-B7
- The Gravitational Slingshot and the Structure of Extragalactic Radio Sources. *William C. Saslaw, Mauri J. Valtonen, and Sverre J. Aarseth.* **190**, 253, 31-A13
- Supergiant Galaxies with Multiple Nuclei. *David C. Jenner.* **191**, 55, 39-E5
- The Nuclei of Peculiar Emission-Line Galaxies. *Patrick S. Osmer, Malcolm G. Smith, and Daniel W. Weedman.* **192**, 279, 54-C12
- Kinematic Phenomena in the Nuclear Region of M81. *Jean W. Goad.* **192**, 311, 54-F2
- Radio Fine Structure in the Galactic Center. *Bruce Balick and Robert H. Sanders.* **192**, 325, 54-G4
- An Atlas of Seyfert Galaxies. *Edward Ye. Khachikian and*

Galactic Nuclei — Continued*Daniel W. Weedman.* **192**, 581, 59-A7*The Nucleus of M31. E. S. Light, R. E. Danielson, and M. Schwarzschild.* **194**, 257, 77-D7*Intense Sub-Arcsecond Structure in the Galactic Center. Bruce Balick and Robert L. Brown.* **194**, 265, 77-E1**Galactic Structure***The Possible Relation of the 3-Kiloparsec Arm to Explosions in the Galactic Nucleus. R. H. Sanders and K. H. Prendergast.* **188**, 489, 16-D4*Structure of the Local Galactic Magnetic Field. R. N. Manchester.* **188**, 637, 17-G12*Tentative Identification of Main-Sequence Stars in the Nuclear Bulge of the Galaxy. Sidney van den Bergh.* **188**, L9, 12-C10*Possible Evidence for Structured Acceleration of Cosmic Rays on a Galactic Scale from Recent γ -Ray Observations. F. W. Stecker, J. L. Puget, A. W. Strong, and J. H. Bredekamp.* **188**, L59, 15-E13*On the Nature of the Unidentified High-Latitude Uhuru Sources. S. S. Holt, E. A. Boldt, P. J. Serlemitsos, S. S. Murray, R. Giacconi, E. M. Kellogg, and T. A. Matilsky.* **188**, L97, 18-D8*On the Gaseous Flows in Disk Galaxies. Allan F. Saaf.* **189**, 33, 19-C8*The Galactic Orbit of the Old Open Cluster NGC 2420. D. W. Keenan and K. A. Innanen.* **189**, 205, 22-C11*Sensitivity of the Star Formation Rate to the Interstellar Gas Abundance of Heavy Elements. Raymond J. Talbot, Jr.* **189**, 209, 22-C14*A Redetermination of the Galactic H I Half-Thickness and a Discussion of Some Dynamical Consequences. P. D. Jackson and Sanford A. Kellman.* **190**, 53, 28-D13*A Second Survey of H II Regions in Galaxies. Paul W. Hodge.* **190**, 241, 30-C14; Suppl. **27**, 113 (No. 239)*The Gravitational Slingshot and the Structure of Extragalactic Radio Sources. William C. Saslaw, Mauri J. Valtonen, and Sverre J. Aarseth.* **190**, 253, 31-A13*The Magellanic Stream. D. S. Mathewson, M. N. Cleary, and J. D. Murray.* **190**, 291, 31-D9*On the Stability of a Disk Galaxy. R. H. Miller.* **190**, 539, 35-D4*Some Recent Results from Galactic and Stellar Evolution Theory. Raymond J. Talbot, Jr., and W. David Arnett.* **190**, 605, 36-A11*Distribution of Orbital Eccentricities of the Globular Clusters. Charles J. Peterson.* **190**, L17, 30-E7*The Nature of Hoag's Object. Robert W. O'Connell, Jeffrey D. Scargle, and W. L. W. Sargent.* **191**, 61, 39-E10*Studies of Neutral Hydrogen Cloud Structure in the Vicinity of the North Polar Spur. G. L. Verschuur.* **191**, 288, 41-G2; Suppl. **27**, 283 (No. 245)*The Distribution of Cosmic Rays in the Galaxy and their Dynamics as Deduced from Recent γ -Ray Observations. J. L. Puget and F. W. Stecker.* **191**, 323, 43-C7*The Kinematics and Dynamics of M51. II. Axisymmetric Properties. R. Brent Tully.* **192**, 235, 52-B14; Suppl. **27**, 437 (No. 251)*The Kinematics and Dynamics of M51. III. The Spiral Structure. R. Brent Tully.* **192**, 235, 52-B14; Suppl. **27**, 449 (No. 251)*Photometric Properties of Model Spherical Galaxies. Richard B. Larson and Beatrice M. Tinsley.* **192**, 293, 54-D11*The Evolution of Supernova Remnants. II. Models of an Explosion in a Plane-stratified Medium. Roger A. Chevalier and John Gardner.* **192**, 457, 56-C4*The Intensity Distribution of Diffuse Galactic H α Emission. R. J. Reynolds, F. J. Roesler, and F. Scherb.* **192**, L53, 57-E2*Composition Gradients Across Spiral Galaxies. G. A. Shields.* **193**, 335, 67-D2*On Density Waves in Galaxies. I. Source Terms and Action Conservation. James W.-K. Mark.* **193**, 539, 70-C9*The Size and Mass of Galaxies, and the Mass of the Universe. J. P. Ostriker, P. J. E. Peebles, and A. Yahil.* **193**, L1, 66-A2*Interstellar Lines in Stars at High Galactic Latitudes. J. G. Cohen.* **194**, 37, 74-D4*An Atlas of Dust and H II Regions in Galaxies. Beverly T. Lynds.* **194**, 213, 76-B11; Suppl. **28**, 391 (No. 267)*A Velocity Separation of Stars and Gas in Carina. Roberta M. Humphreys and Frank J. Kerr.* **194**, 301, 78-A2*An Additional Constraint on the Early Evolution of the Galaxy from New Observations of 47 Tucanae. F. D. A. Hartwick and James E. Hesser.* **194**, L129, 84-E2**Galaxies***Spectroscopic Observations of NGC 4676. Alan Stockton.* **187**, 219, 4-A8*Formation of Galaxies and Clusters of Galaxies by Self-similar Gravitational Condensation. William H. Press and Paul Schechter.* **187**, 425, 7-A3*On the Steady Flow of Gas from the Nuclei of Seyfert Galaxies. Arthur M. Wolfe.* **188**, 243, 13-C8; Addendum, **188**, 441, 15-C14*On the Nature of the Unidentified High-Latitude Uhuru Sources. S. S. Holt, E. A. Boldt, P. J. Serlemitsos, S. S. Murray, R. Giacconi, E. M. Kellogg, and T. A. Matilsky.* **188**, L97, 18-D8*On Gaseous Flows in Disk Galaxies. Allan F. Saaf.* **189**, 33, 19-C8*The Gravitational-Instability Picture and the Nature of the Distribution of Galaxies. P. J. E. Peebles.* **189**, L51, 24-D8*The Polarization of Normal Galaxies at Radio Wavelengths. J. F. C. Wardle and R. A. Sramek.* **189**, 399, 25-A4*A Second Survey of H II Regions in Galaxies. Paul W. Hodge.* **190**, 241, 30-C14; Suppl. **27**, 113 (No. 239)*Late Stages of Stellar Evolution in the Light of Elliptical Galaxies. William K. Rose and Beatrice M. Tinsley.* **190**, 243, 31-A4*Spectroscopy of Objects near Texas Radio-Source Positions. D. Wills and Beverley J. Wills.* **190**, 271, 31-C3*Spectroscopic Observations of Objects Identified with Radio Sources. P. A. Strittmatter, R. F. Carswell, G. Gilbert, and E. M. Burbidge.* **190**, 509, 35-A4*Steps toward the Hubble Constant. I. Calibration of the Linear Sizes of Extragalactic H II Regions. Allan Sandage and G. A. Tammann.* **190**, 525, 35-B4*On the Stability of a Disk Galaxy. R. H. Miller.* **190**, 539, 35-D4*On the Systematic Optical Identification of the Remaining 3C Radio Sources. I. A Search in 47 Fields. Jerome Kristian, Allan Sandage, and Basil Karem.* **191**, 43, 39-C12*The Nature of Hoag's Object. Robert W. O'Connell, Jeffrey D. Scargle, and W. L. W. Sargent.* **191**, 61, 39-E10*The Dwarf Spheroidal Companions to the Andromeda Nebula. Sidney van den Bergh.* **191**, 271, 41-E13*Turnover Radio Spectra of Elliptical Galaxies. Thomas W. Noonan.* **191**, 301, 43-A14*Steps toward the Hubble Constant. II. The Brightest Stars in Late-Type Spiral Galaxies. Allan Sandage and G. A. Tammann.* **191**, 603, 47-A4*Filaments from the Galaxy NGC 1569. Paul W. Hodge.* **191**, L21, 42-B7*A Search for Primeval Galaxies at High Redshifts. R. B. Partridge.* **192**, 241, 54-A4*Search for Primeval Galaxies. Marc Davis and David T. Wilkinson.* **192**, 251, 54-A13*Distances to Extragalactic Supernovae. Robert P. Kirshner and John Kwan.* **193**, 27, 63-C1*Infrared Observations of H II Regions in External Galaxies. S. E. Strom, K. M. Strom, G. L. Grasdalen, and R. W. Capps.* **193**, L7, 66-A8*An Atlas of Dust and H II Regions in Galaxies. Beverly T. Lynds.* **194**, 213, 76-B11; Suppl. **28**, 391 (No. 267)*Galaxy Counts as a Cosmological Test. G. Stanley Brown and Beatrice M. Tinsley.* **194**, 555, 82-B1*Steps toward the Hubble Constant. IV. Distances to 39 Galaxies in the General Field Leading to a Calibration of the Galaxy Luminosity Classes and a First Hint of the Value of*

- Ho. Allan Sandage and G. A. Tammann.* 194, 559, 82-B5
 An Interpretation of Ring Galaxies and the Properties of Intergalactic Gas Clouds. *K. C. Freeman and G. de Vaucouleurs.* 194, 569, 82-C10
 Direct Electronographic Observations of Luminous Connections between Galaxies with Discordant Redshifts. *Merle F. Walker, C. D. Pike, and J. D. McGee.* 194, L125, 84-D8
Galaxies, Clusters of
 Radio Observations of Two Clusters of Galaxies. *F. F. Donivan, Jr., T. D. Carr, and G. C. Omer, Jr.* 187, 11, 1-A11
 $H\alpha$ Emission from Stephan's Quintet. *G. S. Shostak.* 187, 19, 1-B4
 Formation of Galaxies and Clusters of Galaxies by Self-similar Gravitational Condensation. *William H. Press and Paul Schechter.* 187, 425, 7-A3
 The Perseus Cluster: Galaxy Distribution, Anisotropy, and the Mass/Luminosity Ratio. *Neta A. Bahcall.* 187, 439, 7-B3
 Inverse Compton Radiation and the Magnetic Field in Clusters of Galaxies. *D. E. Harris and W. Romanishin.* 188, 209, 13-A3
 High-Energy X-Rays from the Perseus Cluster. *A. Bui-Van, K. Hurley, and G. Vedrenne.* 188, 217, 13-A11
 The Definition, Visibility, and Significance of Redshift-Magnitude Bands. *W. G. Tifft.* 188, 221, 13-A14
 The Small-Scale Anisotropy of the Cosmic Light. *Stephen A. Shectman.* 188, 233, 13-B12
 Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. II. *Herbert J. Rood.* 188, 451, 16-A10
 OSO-7 Observations of a High-Latitude X-Ray Source Associated with Abell Cluster A2052. *C. J. Heinz, G. W. Clark, W. H. G. Lewin, H. W. Schnopper, and G. F. Sprott.* 188, L41, 15-D11
 The Stability of Galaxy Clusters: Neutral Hydrogen Observations. *David S. De Young and Morton S. Roberts.* 189, 1, 19-A5
 Remarks on the Magnitude-Redshift Bands in the Coma Cluster. *Jeno M. Barnothy and Madeleine F. Barnothy.* 189, 11, 19-B1
 A Distance Limit for NGC 7318B in Stephan's Quintet. *G. S. Shostak.* 189, L1, 20-G1
 The Correlation of Radio Emission and Optical Type with X-Ray Emission from Clusters of Galaxies. *Frazer N. Owen.* 189, L55, 24-D11
Copernicus X-Ray Observations of NGC 1275 and the Core of the Perseus Cluster. *A. C. Fabian, J. C. Zarnecki, J. L. Culhane, F. J. Hawkins, A. Peacock, and J. H. Parkinson.* 189, L59, 24-E1
 Dust Grains in a Hot Gas. II. Astrophysical Applications. *Joseph Silk and John Robert Burke.* 190, 11, 28-A14
 Steps toward the Hubble Constant. II. The Brightest Stars in Late-Type Spiral Galaxies. *Allan Sandage and G. A. Tammann.* 191, 603, 47-A4
 The Density Profiles of Rich Clusters of Galaxies. *Amos Yahil.* 191, 623, 47-C1
 Two Chains of Interesting Southern Galaxies: NGC 7172-7173-7174-7176 and NGC 7201-7203-7204. *Vera C. Rubin.* 191, 645, 47-D8
 Limits on Ionized Intracenter Gas in Abell 2199. *Arthur Davidsen and William Welch.* 191, L11, 42-A11
 Interpretation of Redshifts of Galaxies in Clusters. *E. R. Harrison.* 191, L51, 46-A8
 Statistical Analysis of Catalogs of Extragalactic Objects. III. The Shane-Wirtanen and Zwicky Catalogs. *P. J. E. Peebles and M. G. Hauser.* 192, 239, 52-C2; Suppl. 28, 19 (No. 253)
 Statistical Analysis of Catalogs of Extragalactic Objects. IV. Cross-Correlation of the Abell and Shane-Wirtanen Catalogs. *P. J. E. Peebles.* 192, 239, 52-C2; Suppl. 28, 37 (No. 253)
 Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. III. The Page and Jenner Samples of Close Double Galaxies. *Herbert J. Rood.* 193, 1, 63-A4
 Concerning Two Forces Hypothesized to Resolve the Mass Discrepancy of Galaxy Clusters. *Herbert J. Rood.* 193, 15, 63-B5
 Tidal Effects as Criteria for Membership in Small Groups of Galaxies: Application to VV 166. *John Kormendy and Wallace L. W. Sargent.* 193, 19, 63-B9
 Large-Scale Inhomogeneity of the Universe: Implications for the Deceleration Parameter. *Joseph Silk.* 193, 525, 70-B11
 Optical Properties of X-Ray Clusters of Galaxies. *Neta A. Bahcall.* 193, 529, 70-C1
 X-Ray Morphology of the Perseus Cluster. *R. S. Wolff, H. Helava, T. Kifune, and M. C. Weisskopf.* 193, L53, 69-B11
 Studies of Cluster X-Ray Sources: Size Measurements. *E. Kellogg and S. Murray.* 193, L57, 69-C3
 Parkes 0548-322: A BL Lacertae Object in a Cluster of Galaxies. *M. J. Disney.* 193, L103, 72-E11
 The Systematic Properties of Clusters of Galaxies. I. Photometry of 15 Clusters. *Augustus Oemler, Jr.* 194, 1, 74-A4
 Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. IV. Double Compact Galaxies. *Guido L. Chincarini and Herbert J. Rood.* 194, 21, 74-C2
 Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. V. Nine Samples. *Herbert J. Rood.* 194, 27, 74-C8
 Steps toward the Hubble Constant. III. The Distance and Stellar Content of the M101 Group of Galaxies. *Allan Sandage and G. A. Tammann.* 194, 223, 77-A12
 Quasar-Cluster Association as a Test of the Cosmological or Local Hypothesis. *M. B. Bell.* 194, 245, 77-C9
 The Nature of Small Groups of Galaxies in the Local Supercluster. *Edwin L. Turner and Wallace L. W. Sargent.* 194, 587, 82-D13
 Can the Constraint of Finite Mass Smooth Fluctuations in the Background Radiation? *Daniel A. Schwartz.* 194, L139, 84-E11
Galaxies, Individual (arranged by Messier number, NGC number, Radio Galaxies, and other designation)
By Messier Number
 The Mass of M31 as Determined from the Motions of its Globular Clusters. *F. D. A. Hartwick and W. L. W. Sargent.* 190, 283, 31-D3
 The Nucleus of M31. *E. S. Light, R. E. Danielson, and M. Schwarzschild.* 194, 257, 77-D7
 Observation of X-Ray Emission from M31. *Stuart Bowyer, Bruce Margon, Michael Lampton, and Ray Crudace.* 190, 285, 31-D5
 A Preliminary Photoelectric Sequence in the Galaxy M33 of the Local Group. *Allan Sandage and Harold L. Johnson.* 191, 63, 39-E13
 Gas Density and the Rate of Star Formation in M33. *Barry F. Madore, Sidney van den Bergh, and David H. Rogstad.* 191, 317, 43-C2
 Kinematic Phenomena in the Nuclear Region of M81. *Jean W. Goad.* 192, 311, 54-F2
 A Study of the $H\alpha$ Absorption in the Galaxy M82 by Radio Interferometry. *L. Weliachew.* 191, 639, 47-D2
 Comparison of the Optical Spectrum of the Filaments with the Spectrum of the Central Region of M82. *Natarajan Visvanathan.* 192, 319, 54-F11
 Aperture-Synthesis Observations of $H\alpha$ in the Galaxy M83. *D. H. Rogstad, I. A. Lockhart, and M. C. H. Wright.* 193, 309, 67-B7
 The Extended X-Ray Source in Virgo and its Relation to M87. *R. C. Catura, L. W. Acton, H. M. Johnson, and W. T. Zautz.* 190, 521, 35-B1
 Steps toward the Hubble Constant. III. The Distance and Stellar Content of the M101 Group of Galaxies. *Allan Sandage and G. A. Tammann.* 194, 223, 77-A12
By NGC Number
 NGC 1068: Possible 3-Millimeter Radio Variability. *William G. Fogarty, Eugene E. Epstein, and John Mottmann.* 191, 305, 43-B4
 Observations of the Infrared Radiation from the Nuclei of NGC

Galaxies, Individual — Continued

- 1068 and NGC 4151. *W. A. Stein, F. C. Gillett, and K. M. Merrill.* **187**, 213, 4-A3
- The Southern Seyfert Galaxies NGC 1566 and NGC 3783. *Patrick S. Osmer, Malcolm G. Smith, and Daniel W. Weedman.* **189**, 187, 22-B8
- Further Evidence for an Explosive Event in the Peculiar Galaxy NGC 1569. *G. de Vaucouleurs, A. de Vaucouleurs, and W. Pence.* **194**, L119, 84-D2
- On the Nuclear Motions in NGC 4151. *Kurt S. Anderson.* **187**, 445, 7-B10
- The Absorption-Line Spectrum of NGC 4151. *Kurt S. Anderson.* **189**, 195, 22-C2
- [NGC 4151] Effect of Inelastic Electron-Atom Collisions on the Balmer Decrement. *W. M. Adams and Vahé Petrosian.* **192**, 199, 51-G8
- The Velocity Field of NGC 4258. *P. C. van der Kruit.* **192**, 1, 50-A4
- The Motions in the Central Region of NGC 4736: Evidence for an Expanding Ring. *P. C. van der Kruit.* **188**, 3, 10-A6
- Upper Limit to the X-Ray Flux from the Supernova in NGC 5253 above 7 keV from the OSO-7. *M. P. Ulmer, W. A. Baity, Wm. A. Wheaton, and L. E. Peterson.* **193**, 535, 70-C6
- The Starlike Nucleus of NGC 6207. *D. W. Weedman and R. F. Carswell.* **188**, 1, 10-A4
- Radio Galaxies*
- The Rapidly Variable Radio Source 3C 120. *G. A. Seielstad.* **193**, 55, 63-E2
- By Other Designation*
- On the Tidal Origin of the Bridge of Arp 295. *Alan Stockton.* **190**, L47, 33-F1
- Markarian 348: A Variable Radio Source. *R. A. Sramek and H. M. Tovmassian.* **191**, L13, 42-A13
- The Dwarf Spheroidal Companions to the Andromeda Nebula. *Sidney van den Bergh.* **191**, 271, 41-E13
- The Structure of the Fornax Dwarf Galaxy. *P. W. Hodge and Dale W. Smith.* **188**, 19, 10-B6
- Physical Characteristics of Giant Stars in the Draco Dwarf Spheroidal Galaxy. *F. D. A. Hartwick and Robert D. McClure.* **193**, 321, 67-C3
- The Transparency of the Small Magellanic Cloud. *Paul W. Hodge.* **192**, 21, 50-B5
- Galaxies, Motions in**
- On the Nuclear Motions in NGC 4151. *Kurt S. Anderson.* **187**, 445, 7-B10
- The Motions in the Central Region of NGC 4736: Evidence for an Expanding Ring. *P. C. van der Kruit.* **188**, 3, 10-A6
- On the Tidal Origin of the Bridge of Arp 295. *Alan Stockton.* **190**, L47, 33-F1
- Supergiant Galaxies with Multiple Nuclei. *David C. Jenner.* **191**, 55, 39-E5
- A Study of the H I Absorption in the Galaxy M82 by Radio Interferometry. *L. Welischew.* **191**, 639, 47-D2
- Two Chains of Interesting Southern Galaxies: NGC 7172-7173-7174-7176 and NGC 7201-7203-7204. *Vera C. Rubin.* **191**, 645, 47-D8
- The Velocity Field of NGC 4258. *P. C. van der Kruit.* **192**, 1, 50-A4
- The Kinematics and Dynamics of M51. I. The Observations. *R. Brent Tully.* **192**, 235, 52-B14; Suppl. **27**, 415 (No. 251)
- The Kinematics and Dynamics of M51. II. Axisymmetric Properties. *R. Brent Tully.* **192**, 235, 52-B14; Suppl. **27**, 437 (No. 251)
- The Kinematics and Dynamics of M51. III. The Spiral Structure. *R. Brent Tully.* **192**, 235, 52-B14; Suppl. **27**, 449 (No. 251)
- Kinematic Phenomena in the Nuclear Region of M81. *Jean W. Goad.* **192**, 311, 54-F2
- Further Evidence for an Explosive Event in the Peculiar Galaxy NGC 1569. *G. de Vaucouleurs, A. de Vaucouleurs, and W. Pence.* **194**, L119, 84-D2
- Galaxies, Photometry of**
- The Structure of the Fornax Dwarf Galaxy. *P. W. Hodge and Dale W. Smith.* **188**, 19, 10-B6
- Variable N Galaxies as Composite Systems. *Thomas F. Adams.* **188**, 463, 16-B7
- The Southern Seyfert Galaxies NGC 1566 and NGC 3783. *Patrick S. Osmer, Malcolm G. Smith, and Daniel W. Weedman.* **189**, 187, 22-B8
- 10-Micron Observations of Southern-Hemisphere Galaxies. *D. E. Kleinmann and E. L. Wright.* **191**, L19, 42-B5
- Photometric Properties of Model Spherical Galaxies. *Richard B. Larson and Beatrice M. Tinsley.* **192**, 293, 54-D11
- Optical and Infrared Observations of the Jet of M87. *T. D. Kinman, G. L. Grasdalen, and G. H. Rieke.* **194**, L1, 76-C2
- Galaxies, Stellar Content of**
- Giant Dominance in E/SO Galaxies. *Robert W. O'Connell.* **193**, L49, 69-B8
- Galaxy, The**
- Molecular Clouds in the Galactic Nucleus. *N. Z. Scoville, P. M. Solomon, and K. B. Jefferts.* **187**, L63, 6-C1
- Galactic Arm Structure and Gamma-Ray Astronomy. *G. F. Bignami and C. E. Fichtel.* **189**, L65, 24-E6
- Large-Scale Effects of Supernova Remnants on the Galaxy: Generation and Maintenance of a Hot Network of Tunnels. *Donald P. Cox and Barham W. Smith.* **189**, L105, 27-C7
- SAS-2 Observations of the High-Energy Gamma Radiation from the Vela Region. *D. J. Thompson, G. F. Bignami, C. E. Fichtel, and D. A. Kniffen.* **190**, L51, 33-F4
- 34-Micron Observations of Eta Carinae, G33.6-0.2, and the Galactic Center. *E. Sutton, E. E. Becklin, and G. Neugebauer.* **190**, L69, 33-G7
- A High-Sensitivity Pulsar Survey. *R. A. Hulse and J. H. Taylor.* **191**, L59, 46-B3
- Upper Limits to Soft Gamma-Ray Flux from Seven X-Ray Sources and from the Galactic Plane. *V. Schönfelder and G. Lichten.* **192**, L1, 53-A2
- Gamma-Ray Bursts**
- A Preliminary Catalog of Transient Cosmic Gamma-Ray Sources Observed by the Vela Satellites. *Ian B. Strong, Ray W. Klebesadel, and Roy A. Olson.* **188**, L1, 12-C2
- Nucleosynthesis in White-Dwarf Atmospheres. *Fred Hoyle and Donald D. Clayton.* **191**, 705, 48-A8
- Spectra Measurements of a Cosmic Gamma-Ray Burst with Fast Time Resolution. *W. L. Imhof, G. H. Nakano, R. G. Johnson, J. R. Kilner, J. B. Reagan, R. W. Klebesadel, and I. B. Strong.* **191**, L7, 42-A7
- Search for Optical Emission from Cosmic Gamma-Ray Bursts. *J. E. Grindlay, E. L. Wright, and R. E. McCroskey.* **192**, L113, 61-E6
- The Origin of the Cosmic Gamma-Ray Bursts. *S. Sofia and H. M. Van Horn.* **194**, 593, 82-E5
- Observation of a Cosmic Gamma-Ray Burst on Apollo 16. I. Temporal Variability and Energy Spectrum. *A. E. Metzger, R. H. Parker, D. Gilman, L. E. Peterson, and J. I. Trombka.* **194**, L19, 76-D9
- Observation of a Cosmic Gamma-Ray Burst on Apollo 16. II. X-Ray Time Profile and Source Location. *J. I. Trombka, E. L. Eller, R. L. Schmadebeck, I. Adler, A. E. Metzger, D. Gilman, P. Gorenstein, and P. Bjorkholm.* **194**, L27, 76-E2
- Gamma Rays**
- Observation of Gamma-Radiation from the Galactic Center Region. *G. H. Share, R. L. Kinzer, and N. Seeman.* **187**, 45, 1-D1
- Early Gamma Rays from Supernovae. *S. A. Colgate.* **187**, 333, 5-B2
- Do Cosmic Rays Heat HZ Herculis? *K. Brecher and P. Morrison.* **187**, 349, 5-C5
- Diffuse Cosmic Gamma Radiation above 10 MeV. *G. H. Share, R. L. Kinzer, and N. Seeman.* **187**, 511, 7-G2
- Cosmic Gamma-Ray Burst Detected with an Instrument on Board the OGO-5 Satellite. *Jacques L'Heureux.* **187**, L53, 6-B5
- Cosmic Gamma-Ray Bursts from Relativistic Dust Grains.

- Jonathan E. Grindlay and G. G. Fazio.** **187**, L93, 9-D2
Gamma-Ray Lines from Novae. *Donald D. Clayton and Fred Hoyle.* **187**, L101, 9-D9
Line ^{57}Co Gamma Rays: New Diagnostic of Supernova Structure. *Donald D. Clayton.* **188**, 155, 11-E6
A Preliminary Catalog of Transient Cosmic Gamma-Ray Sources Observed by the Vela Satellites. *Ian B. Strong, Ray W. Klebesadel, and Roy A. Olson.* **188**, L1, 12-C2
Early Evolution of Radio Outbursts and a Possible Transient Emission of High-Energy Photons. *F. Pacini and M. Salvati.* **188**, L55, 15-E9
Possible Evidence for Structured Acceleration of Cosmic Rays on a Galactic Scale from Recent γ -Ray Observations. *F. W. Stecker, J. L. Puget, A. W. Strong, and J. H. Bredekamp.* **188**, L59, 15-E13
Observation of a Celestial Hard X-Ray Burst in Coincidence with a Gamma-Ray Burst. *G. G. C. Palumbo, G. Pizzichini, and G. R. Vespignani.* **189**, L9, 20-G8
Galactic Arm Structure and Gamma-Ray Astronomy. *G. F. Bignami and C. E. Fichtel.* **189**, L65, 24-E6
SAS-2 Observations of the High-Energy Gamma Radiation from the Vela Region. *D. J. Thompson, G. F. Bignami, C. E. Fichtel, and D. A. Kniffen.* **190**, L51, 33-F4
The Distribution of Cosmic Rays in the Galaxy and their Dynamics as Deduced from Recent γ -Ray Observations. *J. L. Puget and F. W. Stecker.* **191**, 323, 43-C7
Energy Spectrum and Evidence for Extragalactic Origin of Diffuse Gamma-Radiation in the MeV Range. *V. Schönfelder and G. Lichti.* **191**, L1, 42-A2
478-keV and 431-keV Line Emissions from Alpha-Alpha Reactions. *B. Kozlovsky and R. Ramaty.* **191**, L43, 42-D1
Upper Limits to Soft Gamma-Ray Flux from Seven X-Ray Sources and from the Galactic Plane. *V. Schönfelder and G. Lichti.* **192**, L1, 53-A2
On the e -Process: Its Components and their Neutron Excesses. *Kem L. Hainebach, Donald D. Clayton, W. David Arnett, and S. E. Woosley.* **193**, 157, 64-E3
Gamma-Ray Bursts from Magnetic White Dwarfs. *G. Channmugam.* **193**, L75, 69-D6
Gas Dynamics
The Possible Relation of the 3-Kiloparsec Arm to Explosions in the Galactic Nucleus. *R. H. Sanders and K. H. Prendergast.* **188**, 489, 16-D4
Accretion Flows in Galactic X-Ray Sources. I. Optically Thin Spherically Symmetric Model. *James Buff and Richard McCray.* **189**, 147, 20-D10
A Redetermination of the Galactic H \pm Half-Thickness and a Discussion of Some Dynamical Consequences. *P. D. Jackson and Sanford A. Kellman.* **190**, 53, 28-D13
Old Planetary Nebulae and the Relation between Size and Expansion Velocity. *Thomas J. Bohuski and Malcolm G. Smith.* **193**, 197, 65-A1
Gaseous Nebulae: see Nebulae
Globular Clusters
The Mass of the Globular Cluster NGC 6388. *Garth Illingworth and K. C. Freeman.* **188**, L83, 18-C10
Cyanogen-Band Strengths of Giant Stars in 47 Tucanae. *Robert D. McClure and Wayne Osborn.* **189**, 405, 25-A11
Are the UV Stars Nuclear-Powered? *J. G. Hills.* **190**, 109, 29-A14
The Mass of M31 as Determined from the Motions of its Globular Clusters. *F. D. A. Hartwick and W. L. W. Sargent.* **190**, 283, 31-D3
Distribution of Orbital Eccentricities of the Globular Clusters. *Charles J. Peterson.* **190**, L17, 30-E7
Two Mira Variables in the Stellar System Terzan 5. *Hyron Spinrad, Malcolm G. Smith, and Eugene Harlan.* **192**, 405, 55-F8
The Unusual Horizontal Branch of NGC 2808. *William E. Harris.* **192**, L161, 62-A13
Physical Characteristics of Giant Stars in the Anomalous Globular Cluster NGC 362. *Robert D. McClure and John Norris.* **193**, 139, 64-D1
Physical Characteristics of Giant Stars in the Draco Dwarf Spheroidal Galaxy. *F. D. A. Hartwick and Robert D. McClure.* **193**, 321, 67-C3
On Using Entropy Arguments to Study the Evolution and Secular Stability of Spherical Stellar-Dynamical Systems. *James R. Ipser.* **193**, 463, 68-F5
Advanced Evolution in Globular Clusters. I. The Ultraviolet-bright Stars in Eight Globular Clusters. *Robert Zinn.* **193**, 593, 70-G5
Neutral Helium Line Strengths. VII. The Population II B Star Barnard 29 in M31. *L. H. Auer and John Norris.* **194**, 87, 74-G12
Advanced Evolution in Globular Clusters. II. The Ultraviolet-bright Stars in Omega Centauri. *John Norris.* **194**, 109, 75-B4
Masses and Luminosities of Population II Cepheids. *E. Böhm-Vitense, P. Szkody, G. Wallerstein, and Icko Iben, Jr.* **194**, 125, 75-C6
An Additional Constraint on the Early Evolution of the Galaxy from New Observations of 47 Tucanae. *F. D. A. Hartwick and James E. Hesser.* **194**, L129, 84-E2
Granules and Supergranules
Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount. *E. M. Reeves, P. V. Foukal, M. C. E. Huber, R. W. Noyes, E. J. Schmahl, J. G. Timothy, J. E. Vernazza, and G. L. Withbroe.* **188**, L27, 12-D11
Granules and Supergranules, Solar
Hydraulic Concentration of Magnetic Fields in the Solar Photosphere. I. Turbulent Pumping. *E. N. Parker.* **189**, 563, 26-F1
Hydraulic Concentration of Magnetic Fields in the Solar Photosphere. II. Bernoulli Effect. *E. N. Parker.* **190**, 429, 32-G5
Research with Solar Satellites. *Leo Goldberg.* **191**, 1, 39-A4
Gravitation
The Effect of Gravitational Radiation-Reaction on the Evolution of the Riemann S-Type Ellipsoids. *Bonnie D. Miller.* **187**, 609, 8-G2
Search for Gravitational Radiation from Pulsars. *Terry S. Mast, Jerry E. Nelson, and John A. Saarloos.* **187**, L49, 6-B2
On Gravitational-Lens Quasars. *L. N. K. de Silva.* **189**, 177, 22-A13
The Gravitational-Instability Picture and the Nature of the Distribution of Galaxies. *P. J. E. Peebles.* **189**, L51, 24-D8
Post-Newtonian Neutron Stars. *Robert V. Wagoner and Robert C. Malone.* **189**, L75, 24-F2
Relativistic Stellar Stability: Preferred-Frame Effects. *Wei-Tou Ni.* **190**, 131, 29-C8
Faculae and the Solar Oblateness. II. *R. H. Dicke.* **190**, 187, 29-G4
The Space-Time of Axisymmetric Gravitating Masses. *K. Y. Fu.* **190**, 411, 32-F2
The Double Quasar 1548+115a,b as a Gravitational Lens. *J. Richard Gott III and James E. Gunn.* **190**, L105, 37-F3
Gravitational Radiation from Stellar Collapse. *T. X. Thuan and J. P. Ostriker.* **191**, L105, 49-A6
Perturbations of a Rotating Black Hole. III. Interaction of the Hole with Gravitational and Electromagnetic Radiation. *Saul A. Teukolsky and William H. Press.* **193**, 443, 68-D12
Structure of the Jovian Envelope from Pioneer 10 Gravity Data. *J. D. Anderson, W. B. Hubbard, and W. L. Slattery.* **193**, L149, 73-B3
Thermodynamic Stability of Relativistic Rotating Stellar Configurations and a Maximum Principle for the Entropy. *J. Katz and G. Horwitz.* **194**, 439, 79-D3
H II Regions: see Nebulae
High-Velocity Stars
Do OB Runaways Have Collapsed Companions? *Jacob D. Bekenstein and Richard L. Bowers.* **190**, 653, 36-E11
The Nature of Faint Blue Stars in the Halo. II. *Jesse L. Green-*

- High-Velocity Stars — Continued**
- stein and Anneila I. Sargent. **192**, 813, 61-C11; Suppl. **28**, 157 (No. 259)
- The Subgiant CH Stars. Howard E. Bond. **194**, 95, 75-A5
- Horizontal-Branch Stars**
- Horizontal-Branch Evolution with Semiconvection. I. Interior Evolution. Allen V. Sweigart and Peter G. Gross. **190**, 101, 29-A7
- The Nature of Faint Blue Stars in the Halo. II. Jesse L. Greenstein and Anneila I. Sargent. **192**, 813, 61-C11; Suppl. **28**, 157 (No. 259)
- The Unusual Horizontal Branch of NGC 2808. William E. Harris. **192**, L161, 62-A13
- Physical Characteristics of Giant Stars in the Anomalous Globular Cluster NGC 362. Robert D. McClure and John Norris. **193**, 139, 64-D1
- Advanced Evolution in Globular Clusters. II. The Ultraviolet-bright Stars in Omega Centauri. John Norris. **194**, 109, 75-B4
- Hydrodynamics**
- On a Criterion for the Onset of Dynamical Instability by a Nonaxisymmetric Mode of Oscillation along a Sequence of Differentially Rotating Configurations. S. Chandrasekhar. **187**, 169, 2-E12
- Relativistic Terms in Nonlinear Pulsation Theory. Cecil G. Davis. **187**, 175, 2-F4
- A Case of Metastability for Slowly Rotating, Supermassive Objects. Helena Dedic and Jean-Louis Tassoul. **188**, 173, 11-F11
- The Evolution of Supernova Remnants. I. Spherically Symmetric Models. Roger A. Chevalier. **188**, 501, 16-E2
- Anisotropic Spheres in General Relativity. Richard L. Bowers and E. P. T. Liang. **188**, 657, 18-B3
- On Gaseous Flows in Disk Galaxies. Allan F. Saaf. **189**, 33, 19-C8
- Numerical Simulation of the Gas Flow in Close Binary Systems. K. H. Prendergast and R. E. Taam. **189**, 125, 20-C3
- The Doppler Splitting of Spectral Lines in Pulsating Stars. Angelo James Skalafuris. **190**, 91, 28-G10
- Rotating Superfluid in Neutron Stars. M. A. Ruderman and P. G. Sutherland. **190**, 137, 29-C14
- Do Pulsars Make Supernovae? II. Calculations of Light Curves for Type II Events. Peter Bodenheimer and Jeremiah P. Ostriker. **191**, 465, 44-F6
- The Calculation of Periodic Pulsations of Stellar Models. R. F. Stellingwerf. **192**, 139, 51-C5
- The Deformed Figures of the Dedeckin Ellipsoids in the Post-Newtonian Approximation to General Relativity. S. Chandrasekhar and Donna D. Elbert. **192**, 731, 60-E1
- CNO Abundances and Hydrodynamic Models of the Nova Outburst. II. 1.00 M_{\odot} Models with Enhanced Carbon and Oxygen. Summer Starrfield, Warren M. Sparks, and J. W. Truran. **192**, 817, 61-C13; Suppl. **28**, 247 (No. 261)
- Black-Hole-Neutron-Star Collisions. James M. Lattimer and David N. Schramm. **192**, L145, 61-G11
- Pulsar Near Fields. Jeffrey L. Parish. **193**, 225, 65-B13
- Production of Magnetic Fields in the Interiors of Stars and Several Effects on Stellar Evolution. E. H. Levy and W. K. Rose. **193**, 419, 68-C3
- Numerical Study of X-Ray Induced Mass Transfer in the HZ Herculis/Hercules X-1 Binary System. Marvin L. Alme and James R. Wilson. **194**, 147, 75-E1
- Hydrogen-deficient Stars**
- The Evolution of the Helium Star Sigma Orionis E. Andrew P. Odell. **194**, 645, 83-B6
- Hydromagnetics**
- "Lorentz Force-free" Pulsar Rotating Fields. V. G. Endean. **187**, 359, 5-C14
- Dynamical Stability of Stationary-Dynamo Magnetic Fields. Eugene H. Levy. **187**, 361, 5-D2
- Rotating Magnetosphere: Far Field Solutions. F. Curtis Michel. **187**, 585, 8-E7
- On the Passage of Radiation through Inhomogeneous, Moving Media. I. The Plane, Differentially Sheared Medium. I. Lerche. **187**, 589, 8-E11
- On the Passage of Radiation through Inhomogeneous, Moving Media. II. The Rotating, Differentially Shearing Medium. I. Lerche. **187**, 597, 8-F5
- Sunspot Models with Alfvén Wave Emission. D. J. Mullan. **187**, 621, 9-A1
- Scattering of Alfvén Waves by Random Density Fluctuations. George C. Valley. **188**, 181, 11-G4
- Physics of Compact Nonthermal Sources. I. Theory of Radiation Processes. T. W. Jones, S. L. O'Dell, and W. A. Stein. **188**, 353, 14-D2
- On the Passage of Radiation through Inhomogeneous, Moving Media. III. The Steady-State Fields of Inertial Charge Distributions. I. Lerche. **188**, 627, 17-G3
- Resistive Diffusion of Force-free Magnetic Fields in a Passive Medium. III. Acceleration of Flare Particles. B. C. Low. **189**, 353, 23-G7
- Hydraulic Concentration of Magnetic Fields in the Solar Photosphere. I. Turbulent Pumping. E. N. Parker. **189**, 563, 26-F1
- On the Electrodynamic Equilibrium of a Space Charge Region around a Rotating Neutron Star with an Aligned Magnetic Field. Werner G. Pilipp. **190**, 391, 32-D11
- The Fokker-Planck Coefficient for Pitch-Angle Scattering of Cosmic Rays. L. A. Fisk, M. L. Goldstein, A. J. Klimas, and G. Sandri. **190**, 417, 32-F7
- Hydraulic Concentration of Magnetic Fields in the Solar Photosphere. II. Bernoulli Effect. E. N. Parker. **190**, 429, 32-G5
- Dynamics of the Solar Magnetic Field. I. Method of Examination of Force-free Magnetic Fields. Y. Nakagawa. **190**, 437, 33-A1
- Dynamics of the Solar Magnetic Field. II. The Energy Spectrum of Large-Scale Solar Magnetic Fields. Y. Nakagawa and Randolph H. Levine. **190**, 441, 33-A5
- Acceleration of Thermal Particles in Collapsing Magnetic Regions. Randolph H. Levine. **190**, 447, 33-A11
- A New Theory of Coronal Heating. Randolph H. Levine. **190**, 457, 33-B8
- Dynamics of the Solar Magnetic Field. III. Location of Solar-Flare Excitation and the Velocity Field Determined from Magnetograms. Randolph H. Levine and Y. Nakagawa. **190**, 703, 37-B6
- Dynamics of the Solar Magnetic Field. IV. Examples of Force-free Magnetic-Field Evolution in Response to Photospheric Motions. Y. Nakagawa and K. Tanaka. **190**, 711, 37-B13
- Research with Solar Satellites. Leo Goldberg. **191**, 1, 39-A4
- On the Passage of Radiation through Inhomogeneous, Moving Media. IV. Radiative Transfer under Single-Particle Compton Scattering. I. Lerche. **191**, 191, 40-G8
- Penetration of a Low-Frequency Magnetic Wave into a Nebula Plasma. William K. Rose, Nicholas A. Krall, and Paulett C. Liewer. **191**, 201, 41-A3
- The Effects of Nonlinear Terms in Cosmic-Ray Diffusion Theory. A. J. Owens. **191**, 235, 41-C5
- The Dynamical Properties of Twisted Ropes of Magnetic Field and the Vigor of New Active Regions on the Sun. E. N. Parker. **191**, 245, 41-D1
- Energetic Electrons in Jupiter's Magnetosphere. F. V. Coroniti. **191**, 287, 41-G1; Suppl. **27**, 261 (No. 244)
- On the Passage of Radiation through Inhomogeneous, Moving Media. V. Line Absorption and Frequency Variations of Optical Depth. I. Lerche. **191**, 753, 48-D13
- On the Passage of Radiation through Inhomogeneous, Moving Media. VI. Dispersion Effects on Phase and Ray Paths in a Plane, Differentially Shearing Medium. I. Lerche. **191**, 759, 48-E4
- On the Passage of Radiation through Inhomogeneous, Moving Media. VII. Concerning the Validity of the Geometrical Optics Approximation. I. Lerche. **191**, 763, 48-E8
- Static Equilibria of the Interstellar Gas in the Presence of Magnetic and Gravitational Fields: Large-Scale Condensations. Telemachos Ch. Mouschovias. **192**, 37, 50-C5

- Starspots on Flare Stars.** *D. J. Mullan.* **192**, 149, 51-D1
Cosmic-Ray Streaming Perpendicular to the Mean Magnetic Field. *M. A. Forman, J. R. Jokipii, and A. J. Owens.* **192**, 535, 57-A10
On the Axisymmetric Pulsar Atmosphere. *Satoshi Hinata and E. Atlee Jackson.* **192**, 703, 60-C1
Rotating Magnetosphere: Acceleration of Plasma from the Surface. *F. Curtis Michel.* **192**, 713, 60-C10
Magnetoacoustic Instability and Termination of Solar Wind. *B. Buti.* **192**, 757, 60-F11
Aligned Rotating Magnetospheres. II. Inclusion of Inertial Forces. *Ernst T. Scharlemann.* **193**, 217, 65-B6
The Diffusive Idealization of Charged-Particle Transport in Random Magnetic Fields. *James A. Earl.* **193**, 231, 65-C4
Resistive Diffusion of Force-free Magnetic Fields in a Passive Medium. IV. The Dynamical Theory. *B. C. Low.* **193**, 243, 65-D2
A Variational Approach to Charged-Particle Transport. *Ian Lerche.* **193**, 711, 72-A12
On the Passage of Radiation through Inhomogeneous, Moving Media. IX. An Initial-Value Problem and an Oscillatory "Steady-State" Problem. *I. Lerche.* **194**, 177, 75-G3
The Interstellar Wake of the Solar Wind. *G. Yu.* **194**, 187, 75-G13
Pitch-Angle Scattering of Charged Particles in a Random Magnetic Field. *J. R. Jokipii.* **194**, 465, 79-E14
Hyperfine Structure
- On the Abundance of Europium.** *Mark R. Hartoog, Charles R. Cowley, and Saul J. Adelman.* **187**, 551, 8-C1
 - The Hyperfine A-Doubling Spectrum of Sulfur Hydride in the $^2\pi$ State.** *W. L. Meerts and A. Dymanus.* **187**, L45, 3-D12
 - Resolution of the Praseodymium Abundance Anomaly in the Ba II Stars.** *Marc S. Allen and Charles R. Cowley.* **190**, 601, 36-A7
 - Radiative Relaxation of Hyperfine Populations.** *John Kwan.* **191**, 101, 40-A12
- Image Processing**
- Four Stellar-Diameter Measurements by a New Technique: Amplitude Interferometry.** *D. G. Currie, S. L. Knapp, and K. M. Liewer.* **187**, 131, 2-C5
 - Seeing: Its Cause and Cure.** *A. T. Young.* **189**, 587, 26-G11
 - Recovery of Images from Atmospherically Degraded Short-Exposure Photographs.** *Keith T. Knox and Brian J. Thompson.* **193**, L45, 66-D1
- Infrared**
- Time Variation of the H₂O Maser and Infrared Continuum in Late-Type Stars.** *P. R. Schwartz, P. M. Harvey, and A. H. Barrett.* **187**, 491, 7-E9
 - Direct Observation of Temperature Amplitude of Solar 300-Second Oscillations.** *H. S. Hudson and C. A. Lindsey.* **187**, L35, 3-D4
 - The 7.5- to 13.5-Micron Spectrum of Saturn.** *F. C. Gillett and W. J. Forrest.* **187**, L37, 3-D6
 - Jupiter: Identification of Ethane and Acetylene.** *S. T. Ridgway.* **187**, L41, 3-D9
 - Supergiant Binary Stars.** *Roberta M. Humphreys and E. P. Ney.* **187**, L75, 6-C12
 - Detection of ^{17}O in IRC+10216.** *D. M. Rank, T. R. Geballe, and E. R. Wollman.* **187**, L111, 9-E3
 - Infrared Variability of V1016 Cygni.** *Paul M. Harvey.* **188**, 95, 11-A7
 - Radiative Transfer within the Mesospheres of Venus and Mars.** *V. Ramanathan and R. D. Cess.* **188**, 407, 15-A5
 - Are 2-Micron Absorptions and 11-Micron Emissions of M Stars Related?** *Theodore D. Faÿ, Jr.* **188**, 553, 17-A12
 - 12-Micron Emission Features of the Galilean Satellites and Ceres.** *Olav L. Hansen.* **188**, L31, 12-E2
 - Infrared Polarization of the Galactic Nucleus.** *H. M. Dyck, R. W. Capps, and C. A. Beichman.* **188**, L103, 18-D13
 - Five-Micron Pictures of Jupiter.** *J. A. Westphal, Keith Mat-*
 - thews, and Richard J. Terrile.* **188**, L111, 18-E6
 - Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission.** *P. M. Harvey, I. Gatley, M. W. Werner, J. H. Elias, N. J. Evans II, B. Zuckerman, G. Morris, T. Sato, and M. M. Litvak.* **189**, L87, 24-F13
 - Infrared Observations of Comet Kohoutek near Perihelion.** *Edward P. Ney.* **189**, L141, 27-E12
 - The Nature of Infrared Excesses in Extreme Be Stars.** *Rudolph Schild, Frederic Chaffee, Jay A. Frogel, and S. Eric Persson.* **190**, 73, 28-F7
 - Infrared Stars in Binary Systems.** *Roberta M. Humphreys and E. P. Ney.* **190**, 339, 32-A1
 - Infrared Observations of Phobos from Mariner 9.** *I. Gatley, H. Kieffer, E. Miner, and G. Neugebauer.* **190**, 497, 33-E2
 - Surface Temperature and Emissivity of Mercury.** *Olav L. Hansen.* **190**, 715, 37-C3
 - Infrared Photometry of Titan.** *F. J. Low and G. H. Rieke.* **190**, L143, 38-A7
 - A Quantitative Study of Silicate Extinction.** *K. L. Day, T. R. Steyer, and D. R. Huffman.* **191**, 415, 44-B13
 - Infrared Observations of Be Stars from 2.3 to 19.5 Microns.** *R. D. Gehrz, J. A. Hackwell, and T. W. Jones.* **191**, 675, 47-F8
 - Submillimeter Observations of the Orion Nebula and NGC 2024.** *B. T. Soifer and H. S. Hudson.* **191**, L83, 46-C11
 - Infrared Emission from H II Regions.** *Nino Panagia.* **192**, 221, 52-B1
 - Infrared Photometry of Wolf-Rayet Stars from 2.3 to 23 Microns.** *J. A. Hackwell, R. D. Gehrz, and J. R. Smith.* **192**, 383, 55-D11
 - A Possible Identification of the 10-Micron "Silicate" Feature.** *Kenrick L. Day.* **192**, L15, 53-B1
 - Jupiter: Identification of Ethane and Acetylene (Erratum).** *S. T. Ridgway.* **192**, L51, 53-D8
 - Infrared Photometry of SS Cygni and RX Andromedae near Maximum.** *Paula Szkody.* **192**, L75, 57-F8
 - Correlated Optical and Infrared Behavior of OJ 287 and Similar Radio Sources.** *G. H. Rieke and T. D. Kinman.* **192**, L115, 61-E8
 - Infrared, Radio, and X-Ray Observations of Cygnus X-3.** *E. E. Becklin, F. J. Hawkins, K. O. Mason, K. Matthews, G. Neugebauer, D. Packman, P. W. Sanford, B. Schupler, A. Stark, and C. G. Wynn-Williams.* **192**, L119, 61-E11
 - Stellar Energy Distributions in an Infrared Cluster in Ara.** *G. W. Lockwood.* **193**, 103, 64-A7
 - New Infrared Measurements of W Virginis Stars.** *R. D. Gehrz and J. A. Hackwell.* **193**, 385, 67-G7
 - An Infrared Photometric Survey of Planetary Nebulae.** *Martin Cohen and Michael J. Barlow.* **193**, 401, 68-A8
 - Infrared Observations of H II Regions in External Galaxies.** *S. E. Strom, K. M. Strom, G. L. Grasdalen, and R. W. Capps.* **193**, L7, 66-A8
 - The Spectrum of VI Cygni No. 12 near 10 Microns.** *G. H. Rieke.* **193**, L81, 69-D12
 - 20- to 40-Micron Spectroscopy of the Orion Nebula.** *J. R. Houck, D. F. Schaak, and R. A. Reed.* **193**, L139, 73-A7
 - Infrared Measurements of Uranus and Neptune.** *G. H. Rieke and F. J. Low.* **193**, L147, 73-B1
 - Infrared Photometry of High-Luminosity Supergiants Earlier than M and the Interstellar Extinction Law.** *J. A. Hackwell and R. D. Gehrz.* **194**, 49, 74-E2
 - Observations of Infrared Polarization in the Orion Nebula.** *H. M. Dyck and C. A. Beichman.* **194**, 57, 74-E9
 - Radiometric Diameters and Albedos of 40 Asteroids.** *David Morrison.* **194**, 203, 76-B1
 - Jupiter: A Comment on the 8- to 14-Micron Limb Darkening.** *L. Trafton and R. Wildey.* **194**, 499, 80-B1
 - Circumstellar Dust Emission from W69 Stars.** *R. D. Gehrz and J. A. Hackwell.* **194**, 619, 82-G4
 - Visual and Infrared Observations of Late-Type Supergiants in the Southern Sky.** *R. M. Humphreys and E. P. Ney.* **194**, 623, 82-G8

Infrared Sources

- Accurate Positions of OH Sources. *C. G. Wynn-Williams, M. W. Werner, and W. J. Wilson.* **187**, 41, 1-C10
- An Infrared Source Associated with a Herbig-Haro Object. *K. M. Strom, S. E. Strom, and G. L. Grasdalen.* **187**, 83, 1-F12
- Interpretation of Epsilon Aurigae. II. Infrared Excess, Secondary Light Variations, and Plausible Formation of a Planetary System. *Su-Shu Huang.* **187**, 87, 1-G6
- Observations of the Infrared Radiation from the Nuclei of NGC 1068 and NGC 4151. *W. A. Stein, F. C. Gillett, and K. M. Merrill.* **187**, 213, 4-A3
- Infrared Studies of H II Regions and OH Sources. *C. G. Wynn-Williams, E. E. Becklin, and G. Neugebauer.* **187**, 473, 7-D8
- Infrared Emission from the Southern H II Region H2-3. *E. E. Becklin, J. A. Frogel, D. E. Kleinmann, G. Neugebauer, S. E. Persson, and C. G. Wynn-Williams.* **187**, 487, 7-E6
- Infrared Spectrum of NGC 1068. *R. F. Jameson, A. J. Longmore, J. A. McLinn, and N. J. Woolf.* **187**, L109, 9-E2
- The Energy Distribution of the Very Red Star in NGC 6231. *R. Schild, J. B. Oke, and L. Searle.* **188**, 71, 10-F4
- Veiling and the Presence of Circumstellar Gas and Dust in Some Infrared Stars. *Roberta M. Humphreys.* **188**, 75, 10-F9
- Free-free and Free-bound Emission in Low-Surface-Gravity Stars. *Robert C. Gilman.* **188**, 87, 10-G13
- Spectrophotometric Observations of the Compact H II Region K3-50 and of NGC 6857. *S. Eric Persson and Jay A. Frogel.* **188**, 523, 16-F9
- VY Canis Majoris. IV. The Emission Bands of ScO. *G. H. Herbig.* **188**, 533, 16-G4
- A Dust-Shell Model of the Infrared Object HD 45677. *John P. Apruzese.* **188**, 539, 16-G10
- Structure of the OH/Infrared Object NML Cygnus. I. Analysis of the Near-Infrared Image. *G. H. Herbig and Jean Lorre.* **189**, 73, 19-F7
- Structure of the OH/Infrared Object NML Cygnus. II. Analysis of the OH Interferometry. *G. H. Herbig.* **189**, 75, 19-F9
- Infrared Fluxes, Spectral Types, and Temperatures for Very Cool Stars. *H. M. Dyck, G. W. Lockwood, and R. W. Capps.* **189**, 89, 19-G7
- 1-Millimeter Observations of the Galactic H II Regions M42 and DR 21. *Peter A. R. Ade, Peter E. Clegg, and John D. G. Rather.* **189**, L23, 21-A7
- Spectrophotometric Observations of a Highly Absorbed Object in Cygnus. *K. M. Merrill and B. T. Soifer.* **189**, L27, 21-A11
- Dust Grains in a Hot Gas. II. Astrophysical Applications. *Joseph Silk and John Robert Burke.* **190**, 11, 28-A14
- Infrared Emission by Dust in NGC 1068 and Three Planetary Nebulae. *R. F. Jameson, A. J. Longmore, J. A. McLinn, and N. J. Woolf.* **190**, 353, 32-B2
- CO and CS in the Orion Nebula. *H. S. Liszt, R. W. Wilson, A. A. Penzias, K. B. Jefferts, P. G. Wannier, and P. M. Solomon.* **190**, 557, 35-E8
- Possible Evidence for a Large Magnetic Field in the Orion Infrared Nebula. *C. A. Beichman and E. J. Chaisson.* **190**, L21, 30-E11
- 34-Micron Observations of Eta Carinae, G333.6-0.2, and the Galactic Center. *E. Sutton, E. E. Becklin, and G. Neugebauer.* **190**, L69, 33-G7
- Infrared and Optical Observations of Herbig-Haro Objects. *S. E. Strom, G. L. Grasdalen, and K. M. Strom.* **191**, 111, 40-B6
- Millimeter-Wavelength Molecular Lines and Far-Infrared Sources. *M. Morris, Patrick Palmer, B. E. Turner, and B. Zuckerman.* **191**, 349, 43-E4
- Time Variations in the OH Microwave and Infrared Emission from Late-Type Stars. *Paul M. Harvey, Kenneth P. Bechis, William J. Wilson, and John A. Ball.* **191**, 599, 46-A5; Suppl. **27**, 331 (No. 248)
- 10-Micron Observations of Southern-Hemisphere Galaxies. *D. E. Kleinmann and E. L. Wright.* **191**, L19, 42-B5
- 350-Micron Mapping of the Orion Molecular Cloud. *D. Y. Gezari, R. R. Joyce, G. Righini, and M. Simon.* **191**, L33, 42-C7
- Infrared Pumping Processes for SiO Masers. *T. R. Geballe and C. H. Townes.* **191**, L37, 42-C10
- Optical Polarization of Selected Herbig-Haro Objects. *K. M. Strom, S. E. Strom, and T. D. Kinman.* **191**, L93, 46-D6
- A New Infrared Complex and Molecular Cloud in Orion. I. *Gatley, E. E. Becklin, K. Matthews, G. Neugebauer, M. V. Penston, and N. Scoville.* **191**, L121, 49-B6
- Near-Infrared Photometry of Unidentified IRC Stars. II. *G. W. Lockwood.* **192**, 113, 51-A12
- Angular Diameter of IRC+10011 at 2.2, 10, and 20 Microns. *R. R. Zappala, E. E. Becklin, K. Matthews, and G. Neugebauer.* **192**, 109, 51-A8
- CO Emission Associated with Sharpless H II Regions. *Dale F. Dickinson, Jay A. Frogel, and S. Eric Persson.* **192**, 347, 55-B1
- Compact Infrared Sources Associated with Southern H II Regions. *Jay A. Frogel and S. Eric Persson.* **192**, 351, 55-B4
- Far-Infrared Emission from H II Regions. II. Multicolor Photometry of Selected Sources and 2.2 Resolution Maps of M42 and NGC 2024. *D. A. Harper.* **192**, 557, 57-C4
- The Nature and Distribution of Carbon Recombination-Line Emission in the Rho Ophiuchi Dark Cloud. *Robert L. Brown, R. H. Gammon, G. R. Knapp, and Bruce Balick.* **192**, 607, 59-C8
- Infrared Polarization of NGC 1068. *R. F. Knacke and R. W. Capps.* **192**, L19, 53-B4
- A High-Resolution Map of the Orion Nebula Region at Far-Infrared Wavelengths. *G. G. Fazio, D. E. Kleinmann, R. W. Noyes, E. L. Wright, M. Zeilik II, and F. J. Low.* **192**, L23, 53-B8
- 1-Millimeter Continuum Radiation from Orion Molecular Cloud 2. *M. W. Werner, J. H. Elias, D. Y. Gezari, and W. E. Westbrook.* **192**, L31, 53-C1
- Infrared Observations of the Radio Source G30.8-0.0 in the W43 Complex. *Judith L. Pipher, G. L. Grasdalen, and Baruch T. Soifer.* **193**, 283, 65-F13
- The Open Cluster NGC 7419 and its M7 Supergiant IRC+60375. *William M. Fawley and Martin Cohen.* **193**, 367, 67-F3
- An Infrared Study of NGC 2024. *G. L. Grasdalen.* **193**, 373, 67-F12
- Detection of New Celestial Objects at Far-Infrared Wavelengths. *M. W. Friedlander, J. H. Goebel, and R. D. Joseph.* **194**, L5, 76-C6
- Radio Observations of the Infrared Source AFCRL 809-2992. *Robert L. Brown.* **194**, L9, 76-C11
- Instabilities**
- On a Criterion for the Onset of Dynamical Instability by a Nonaxisymmetric Mode of Oscillation along a Sequence of Differentially Rotating Configurations. *S. Chandrasekhar.* **187**, 169, 2-E12
- Multiple Solutions and Secular Stability of a $7 M_{\odot}$ Star with Core Helium and Shell Hydrogen Burning. *D. Lauterborn and R. Siquig.* **187**, 299, 4-F12
- Black Holes in Binary Systems: Instabilities of Disk Accretion. *Alan P. Lightman and Douglas M. Eardley.* **187**, L1, 3-B2
- The Occurrence of a Nonspherical Thermal Instability in Red Giant Stars. *Douglas O. Richstone.* **188**, 327, 14-B6
- Do Helium-Shell Flashes Cause Extensive Mixing in Low-Mass Stars? *Allen V. Sweigart.* **189**, 289, 23-C2
- Stably Trapped Proton Fluxes in the Jovian Magnetosphere. *F. V. Coroniti, C. F. Kennel, and R. M. Thorne.* **189**, 383, 24-B13
- The Gravitational-Instability Picture and the Nature of the Distribution of Galaxies. *P. J. E. Peebles.* **189**, L51, 24-D8
- Relativistic Stellar Stability: Preferred-Frame Effects. *Wei-Tou Ni.* **190**, 131, 29-C8
- Large-Scale Wave Structure in the Orion Molecular Cloud. *T. G. Phillips, K. B. Jefferts, P. G. Wannier, and P. A. R. Ade.* **191**, L31, 42-C5

- Static Equilibria of the Interstellar Gas in the Presence of Magnetic and Gravitational Fields: Large-Scale Condensations.** *Telemachos Ch. Mouschovias.* 192, 37, 50-C5
- Effects of Thermal Imbalance on the Pulsational Stability of Stars Undergoing Thermal Runaways.** *J. P. Cox.* 192, L85, 57-G3
- Advanced Evolution of Massive Stars. VI. Oxygen Burning.** *W. David Arnett.* 194, 373, 78-F10
- Thermodynamic Stability of Relativistic Rotating Stellar Configurations and a Maximum Principle for the Entropy.** *J. Katz and G. Horwitz.* 194, 439, 79-D3
- Violation of the Vogt-Russell Theorem for Homogeneous Non-degenerate Stars.** *Richard Stothers.* 194, 699, 83-E12
- Instruments**
- Four Stellar-Diameter Measurements by a New Technique: Amplitude Interferometry.** *D. G. Currie, S. L. Knapp, and K. M. Liewer.* 187, 131, 2-C5
 - Limits to Solar Limb Darkening at a Wavelength of 1.4 Millimeters Derived from Antenna-Beam Parameters.** *P. A. R. Ade, J. D. G. Rather, and P. E. Clegg.* 187, 389, 5-E13
 - The Palomar Radial-Velocity Spectrometer.** *R. F. Griffin and James E. Gunn.* 191, 545, 45-D10
 - Spectrometric Properties of Crystals for X-Ray Astronomy. I.** *A. J. Burek, D. M. Barrus, and R. L. Blake.* 191, 533, 45-C13
- Intergalactic Medium**
- Radio Observations of Two Clusters of Galaxies.** *F. F. Donivan, Jr., T. D. Carr, and G. C. Omer, Jr.* 187, 11, 1-A11
 - The Stability of Galaxy Clusters: Neutral Hydrogen Observations.** *David S. De Young and Morton S. Roberts.* 189, 1, 19-A5
 - Are Quasars Dusty?** *Christopher F. McKee and Vahé Petrosian.* 189, 17, 19-B7
 - Charged Cosmology.** *George W. Barry.* 190, 279, 31-C13
 - Limits on Ionized Intracluster Gas in Abell 2199.** *Arthur Davidsen and William Welch.* 191, L11, 42-A11
 - A Search for a Cosmological Component of the Soft X-Ray Background in the Direction of M31.** *Bruce Margon, Stuart Bowyer, Ray Crudace, Carl Heiles, Michael Lampton, and Thomas Troland.* 191, L117, 49-B3
 - Studies of Cluster X-Ray Sources: Size Measurements.** *E. Kellogg and S. Murray.* 193, L57, 69-C3
 - An Interpretation of Ring Galaxies and the Properties of Intergalactic Gas Clouds.** *K. C. Freeman and G. de Vaucouleurs.* 194, 569, 82-C10
- Interiors, Planetary**
- Deuterium Enrichment of Metallic Hydrogen.** *W. B. Hubbard.* 190, 223, 30-B11
- Interiors, Solar**
- On the Sun's Differential Rotation: It's Maintenance by Large Scale Meridional Motions in the Convection Zone.** *Bernard R. Durney.* 190, 211, 30-A14
 - Solar Models with Low Neutrino Fluxes.** *Roger K. Ulrich.* 188, 369, 14-E4
 - Solar Neutrinos and the Behavior of the Fermi Coupling Constant.** *Arrigo Finzi.* 189, 157, 20-E5
 - The Differential Rotation of the Solar Surface.** *Peter J. Giersch.* 190, 199, 30-A2
 - The Oblateness of the Sun.** *R. H. Dicke and H. Mark Goldberg.* 190, 507, 33-E9; Suppl. 27, 131 (No. 241)
 - Solar Neutrinos and the Influence of Radiative Opacities on Solar Models.** *T. R. Carson, D. Ezer, and R. Stothers.* 194, 743, 84-A12
- Interiors, Stellar**
- Destruction of ^{14}N by $^{14}\text{N}(e^-, v)^{14}\text{C}(\alpha, \gamma)^{18}\text{O}$ in Degenerate Matter.** *R. Mitalas.* 187, 155, 2-D14
 - Multiple Solutions and Secular Stability of a $7 M_\odot$ Star with Core Helium and Shell Hydrogen Burning.** *D. Lauterborn and R. Siquig.* 187, 299, 4-F12
 - A Determination of the Cooling Time and the Speed of the Surface Currents of HZ Herculis.** *Richard E. Dahab.* 187, 351, 5-C7
 - Carbon and Eruptive Stars: Surface Enrichment of Lithium, Carbon, Nitrogen, and ^{13}C by Deep Mixing.** *I.-Juliana Sackmann, Richard L. Smith, and Keith H. Despain.* 187, 555, 8-C5
 - Thermal Pulses in Helium Shell-burning Stars. III.** *R. A. Gingold and D. J. Faulkner.* 188, 145, 11-D11
 - Supernova: The Result of the Death Spiral of a White Dwarf into a Red Giant.** *Warren M. Sparks and Theodore P. Stecher.* 188, 149, 11-E1
 - The Occurrence of a Nonspherical Thermal Instability in Red Giant Stars.** *Douglas O. Richstone.* 188, 327, 14-B6
 - Rediscovery of Eclipsing Binaries. X. The B Stars AG Persei and CW Cassiopeiae.** *Daniel M. Popper.* 188, 559, 17-B3
 - Pulsational Stability of Stars in Thermal Imbalance. II. An Energy Approach.** *William R. Davey and John P. Cox.* 189, 113, 20-B5
 - Do Helium-Shell Flashes Cause Extensive Mixing in Low-Mass Stars?** *Allen V. Sweigart.* 189, 289, 23-C2
 - An Excitation Mechanism for Pulsations in Beta Cephei Stars.** *Yoji Osaki.* 189, 469, 25-F10
 - An Interpretation of the Puzzling Observations of FG Sagittae.** *I.-Juliana Christy-Sackmann and Keith H. Despain.* 189, 523, 26-C4
 - Dynamical Phases of Rotating Supermassive Stars.** *Klaus J. Fricke.* 189, 535, 26-D1
 - Horizontal-Branch Evolution with Semiconvection. I. Interior Evolution.** *Allen V. Sweigart and Peter G. Gross.* 190, 101, 29-A7
 - Are the UV Stars Nuclear-Powered?** *J. G. Hills.* 190, 109, 29-A14
 - Relativistic Stellar Stability: Preferred-Frame Effects.** *Wei-Tou Ni.* 190, 131, 29-C8
 - late Stages of Stellar Evolution in the Light of Elliptical Galaxies.** *William K. Rose and Beatrice M. Tinsley.* 190, 243, 31-A4
 - Models for Nuclei of Planetary Nebulae and Ultraviolet Stars.** *J. I. Katz, R. C. Malone, and E. E. Salpeter.* 190, 359, 32-B8
 - Models of Asymptotic-Giant-Branch Stars.** *P. R. Wood.* 190, 609, 36-B1
 - Core-Helium-Burning Stars in Young Clusters in the Large Magellanic Cloud.** *J. W. Robertson.* 191, 67, 39-F6
 - Theoretical Evolution of Extremely Metal-poor Stars.** *Raymond L. Wagner.* 191, 173, 40-F5
 - Pulsational Stability of Stars in Thermal Imbalance. III. Analysis in Terms of Absolute Variations.** *John P. Cox, William R. Davey, and Morris L. Aizenman.* 191, 439, 44-D9
 - Island Solutions in Linear Series of Static Stellar Models with Core Helium and Shell Hydrogen Burning for $M = 5, 7,$ and $9 M_\odot$.** *D. Lauterborn and R. A. Siquig.* 191, 589, 45-G11
 - A Study of Nucleosynthesis during Explosive Carbon Burning.** *R. C. Pardo, R. G. Couch, and W. D. Arnett.* 191, 711, 48-B1
 - Are Stellar Surface Heavy-Element Abundances Systematically Enhanced?** *Paul C. Joss.* 191, 771, 48-F1
 - Influence of Rotation on the Maximum Mass of Pulsationally Stable Stars.** *Richard Stothers.* 192, 145, 51-C11
 - The Structure of Alpha Virginis. II. The Apsidal Constant.** *Andrew P. Odell.* 192, 417, 55-G6
 - Studies of Hydrodynamic Events in Stellar Evolution. III. Ejection of Planetary Nebulae.** *G. S. Kutter and Warren M. Sparks.* 192, 447, 56-B9
 - Helium-Shell Flashes in Population I Stars.** *B. Paczyński.* 192, 483, 56-E1
 - Studies of Evolved Stars. III. Models of FG Sagittae Consistent with s-Process Nucleosynthesis.** *Roger K. Ulrich.* 192, 507, 56-F10
 - Convective Overshoot Mixing in Old Open Clusters.** *M. J. Prather and P. Demarque.* 193, 109, 64-A12
 - Advanced Evolution of Massive Stars.** *W. David Arnett.* 193, 169, 64-F2
 - Asymptotic Giant-Branch Evolution of a $0.6 M_\odot$ Star.** *Robert A. Gingold.* 193, 177, 64-F11

Interiors, Stellar — Continued

The Effects of Differences in Composition, Equation of State, and Mixing Length upon the Structure of White-Dwarf Convection Zones. *G. Fontaine, H. M. Van Horn, K.-H. Böhm, and T. C. Grenfell.* 193, 205, 65-A9

Production of Magnetic Fields in the Interiors of Stars and Several Effects on Stellar Evolution. *E. H. Levy and W. K. Rose.* 193, 419, 68-C3

Advanced Evolution in Globular Clusters. II. The Ultraviolet-bright Stars in Omega Centauri. *John Norris.* 194, 109, 75-B4

Advanced Evolution of Massive Stars. VI. Oxygen Burning. *W. David Arnett.* 194, 373, 78-F10

The Urca Process in Dense Stellar Interiors. *Richard G. Couch and Gregory L. Loumos.* 194, 385, 78-G9

The Gap in the Two-Color Diagram of Main-Sequence Stars. *E. Bohm-Vitense and R. Canterna.* 194, 629, 83-A1

The Apsidal-Motion Test for Models of Main-Sequence Stars. *Richard Stothers.* 194, 651, 83-B11

Pulsational Stability of Stars in Thermal Imbalance. IV. Direct Solution of Differential Equation. *M. L. Aizenman and J. P. Cox.* 194, 663, 83-C7

Pulsational Stability of Stars in Thermal Imbalance. V. Eigen-solutions for Quasi-adiabatic Oscillations. *William R. Davy.* 194, 687, 83-E2

A Comparison of Homogeneous Stellar Models Based on the Cox-Stewart and Carson Opacities. *Richard Stothers.* 194, 695, 83-E9

Violation of the Vogt-Russell Theorem for Homogeneous Non-degenerate Stars. *Richard Stothers.* 194, 699, 83-E12

The Structure of Synchronously Rotating Close Binaries Built on Polytropic Model $\nu = 3$. *Louis C. Green and Eleanor K. Kolchin.* 194, 757, 84-B12; Suppl. 28, 449 (No. 271)

Interplanetary Medium

Interpretation of Columnar Content Measurements of the Solar-Wind Turbulence. *Philip S. Callahan.* 187, 185, 2-F12

Observations of He I 584 Å Nighttime Radiation: Evidence for an Interstellar Source of Neutral Helium. *Francesco Paresce, Stuart Bowyer, and Shailendra Kumar.* 187, 633, 9-A12

Scattering of Alfvén Waves by Random Density Fluctuations. *George C. Valley.* 188, 181, 11-G4

Coherent Propagation of Charged-Particle Bunches in Random Magnetic Fields. *James A. Earl.* 188, 379, 14-F1

Acceleration of the Solar Wind by the Interplanetary Magnetic Field. *Aaron Barnes.* 188, 645, 18-A6

Anomalies in the Composition of Interplanetary Heavy Ions with $0.01 < E < 40$ MeV per amu. *J. H. Chan and P. B. Price.* 190, L39, 30-G3

The Effects of Nonlinear Terms in Cosmic-Ray Diffusion Theory. *A. J. Owens.* 191, 235, 41-C5

Scintillation and Apparent Angular Diameter. *M. H. Cohen and W. M. Cronyn.* 192, 193, 51-G3

Magnetoacoustic Instability and Termination of Solar Wind. *B. Buti.* 192, 757, 60-F11

Observations of Helium in the Interplanetary/Interstellar Wind: The Solar-Wake Effect. *C. S. Weller and R. R. Meier.* 193, 471, 68-F13

The Interstellar Wake of the Solar Wind. *G. Yu.* 194, 187, 75-G13

Interstellar Extinction

Neutral Potassium in Dusty Clouds. *Barry L. Lutz.* 191, L131, 49-C1

Is H γ a Source of Diffuse Interstellar Lines? *E. Herbst, T. A. Patterson, D. W. Norcross, and W. C. Lineberger.* 191, L143, 49-C11

A Possible Identification of the 10-Micron "Silicate" Feature. *Kenrick L. Day.* 192, L15, 53-B1

The Spectrum of V1 Cygni No. 12 near 10 Microns. *G. H. Rieke.* 193, L81, 69-D12

Infrared Photometry of High-Luminosity Supergiants Earlier than M and the Interstellar Extinction Law. *J. A. Hackwell and R. D. Gehrz.* 194, 49, 74-E2

Diffuse Interstellar Band Formation in Dense Clouds. *Theodore P. Snow, Jr., and Judith G. Cohen.* 194, 313, 78-B2

Interstellar Matter

Observation of Gamma-Radiation from the Galactic Center Region. *G. H. Share, R. L. Kinzer, and N. Seeman.* 187, 45, 1-D1

Interstellar Absorption of X-Rays. *E. L. Fireman.* 187, 57, 1-D13

Comment on "Galactic Magnetic Fields: Cellular or Filamentary Structure?". *E. N. Parker.* 187, 191, 2-G4

A Deviation-Defect Method for the Detection of Optically Thick Neutral Hydrogen. *P. L. Baker.* 187, 223, 4-A11

The Interstellar Abundance of Titanium. *George Wallerstein and Donald Goldsmith.* 187, 237, 4-B9

Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIV. An Extension of the Survey of Lyman- α Absorption from Interstellar Hydrogen. *Edward B. Jenkins and Blair D. Savage.* 187, 243, 4-C1

Depletion of Interstellar Sodium and Calcium. *Richard E. White.* 187, 449, 7-B13

Interstellar Abundances: Gas and Dust. *George B. Field.* 187, 453, 7-C3

Interstellar Polarization from a Medium with Changing Grain Alignment. *P. G. Martin.* 187, 461, 7-C10

On the Opacity of the Interstellar Medium to Ultrasoft X-Rays and Extreme-Ultraviolet Radiation. *Raymond Crudace, Francesco Paresce, Stuart Bowyer, and Michael Lampton.* 187, 497, 7-F1

A Search for Soft X-Ray Sources in the Galactic Anticenter. *R. W. Hill, G. A. Burginon, F. D. Seward, J. P. Stoering, and A. Toor.* 187, 505, 7-F9

Detection of Interstellar Lithium in the Direction of 55 Cygni. *Paul A. Vanden Bout and Gerald Grupsmith.* 187, L9, 3-B8

The Methanol Source in Orion at 1.2 Centimeters. *M. F. Chui, A. C. Cheung, D. Matsakis, C. H. Townes, and A. G. Cardiasmenos.* 187, L19, 3-C2

Ionization of Carbon and Nitrogen in the Intercloud Medium. *M. Kafatos, H. Gerola, S. Hatchett, and R. McCray.* 187, L113, 9-E5

Observations of Structure in the Interstellar Polarization Curve: Preliminary Results. *G. E. Mavko, D. S. Hayes, J. M. Greenberg, and W. A. Hiltner.* 187, L117, 9-E9

The He $^+$ /H $^+$ Ratio in Dark Clouds. *Robert L. Brown and J. Gómez-González.* 188, 475, 16-C4

Optical Interstellar Line Studies of a Nearby Cold Cloud. *Richard M. Crutcher and Kurt W. Riegel.* 188, 481, 16-C10

A Study of Interstellar Polarization at the $\lambda\lambda$ 4430 and 5780 Features in HD 183143. *P. G. Martin and J. R. P. Angel.* 188, 517, 16-F4

Studies of Neutral-Hydrogen Cloud Structure. *G. L. Verschuer.* 188, 669, 18-B13; Suppl. 27, 65 (No. 238)

Interferometric Scans of Interstellar K I Lines. *L. M. Hobbs.* 188, L67, 15-F5

Further Evidence for an Interstellar Source of Nighttime He I 584 Å Radiation. *Francesco Paresce, Stuart Bowyer, and Shailendra Kumar.* 188, L71, 15-F8

On Ionization in H I Regions. *L. M. Hobbs.* 188, L107, 18-E3

Statistical Time-dependent Model for the Interstellar Gas. *Humberto Gerola, Minas Kafatos, and Richard McCray.* 189, 55, 19-E1

On the Recombination-Line Observations toward Supernova 3C 391. *E. J. Chaisson.* 189, 69, 19-F3

Sensitivity of the Star Formation Rate to the Interstellar Gas Abundance of Heavy Elements. *Raymond J. Talbot, Jr.* 189, 209, 22-C14

On the Velocity Structure of the Interstellar Clouds near Rho Ophiuchi. *Judith G. Cohen and George Wallerstein.* 189, 259, 22-G9

The Polarization of Normal Galaxies at Radio Wavelengths. *J. F. C. Wardle and R. A. Sramek.* 189, 399, 25-A4

Line Spectra in Interstellar Clouds. I. The Perseus 2 Cloud. *Frederic H. Chaffee, Jr.* 189, 427, 25-C5

- Hartree-Fock Bound States for Molecule-Ions HeC^{2+} and HeC^+ . *S. W. Harrison, G. A. Henderson, L. J. Massa, and P. Solomon.* **189**, 605, 27-B2
- The Interstellar Depletion Mystery, or Where Have All Those Atoms Gone? *J. Mayo Greenberg.* **189**, L81, 24-F8
- Large-Scale Effects of Supernova Remnants on the Galaxy: Generation and Maintenance of a Hot Network of Tunnels. *Donald P. Cox and Barham W. Smith.* **189**, L105, 27-C7
- A New Limit on the Interstellar Abundance of Boron. *Donald C. Morton, Andrew M. Smith, and Theodore P. Stecher.* **189**, L109, 27-C11
- Dust Grains in a Hot Gas. I. Basic Physics. *John Robert Burke and Joseph Silk.* **190**, 1, 28-A4
- Dust Grains in a Hot Gas. II. Astrophysical Applications. *Joseph Silk and John Robert Burke.* **190**, 11, 28-A14
- Numerical Models of the Evolution of Supernova Remnants: The Shell-Formation Stage. *W. C. Straka.* **190**, 59, 28-E5
- Monte Carlo Model of Reflection Nebulae: Intensity Gradients. *T. Roark, B. Roark, and G. W. Collins II.* **190**, 67, 28-F1
- Are the UV Stars Nuclear-Powered? *J. G. Hills.* **190**, 109, 29-A14
- Cosmic Background Radiation at 1.32 Millimeters. *D. J. Hegyi, W. A. Traub, and N. P. Carleton.* **190**, 543, 35-D8
- Interstellar Lines in the Ultraviolet Spectrum of Delta Scorpii. *Andrew M. Smith.* **190**, 565, 35-F2
- Interstellar Scattering of the Vela Pulsar. *D. C. Backer.* **190**, 667, 36-F13
- Chlorine-bearing Molecules in Interstellar Clouds. *M. Jura.* **190**, L33, 30-F12
- An Interpretation of the Observed Oxygen and Nitrogen Enhancements in Low-Energy Cosmic Rays. *L. A. Fisk, B. Kozlofsky, and R. Ramaty.* **190**, L35, 30-F14
- On Detecting Cold Low-Density Interstellar Gas. *Jon C. Weisheit.* **190**, L121, 37-G2
- Ionization Mechanisms of the Intercloud Medium. *P. Mészáros.* **191**, 79, 39-G4
- Upper Limits to the Flux of Cosmic Rays and X-Rays in Interstellar Clouds. *Edward J. O'Donnell and William D. Watson.* **191**, 89, 40-A1
- Infrared and Optical Observations of Herbig-Haro Objects. *S. E. Strom, G. L. Grasdalen, and K. M. Strom.* **191**, 111, 40-B6
- Gas Density and the Rate of Star Formation in M33. *Barry F. Madore, Sidney van den Bergh, and David H. Rodgers.* **191**, 317, 43-C2
- Formation and Destruction Rates of Interstellar H_2 . *M. Jura.* **191**, 375, 43-G1
- A Comparison of Interstellar Na I , Ca II , and K I Absorption. *L. M. Hobbs.* **191**, 381, 43-G6
- Statistical Properties of Interstellar Clouds. *L. M. Hobbs.* **191**, 395, 44-A7
- Ionization of the Low-Density Interstellar Medium. *S. Torres-Peimbert, A. Lazcano-Araujo, and M. Peimbert.* **191**, 401, 44-A12
- A Quantitative Study of Silicate Extinction. *K. L. Day, T. R. Steyer, and D. R. Huffman.* **191**, 415, 44-B13
- Rotational Excitation of HCN by Collisions. *Sheldon Green and Patrick Thaddeus.* **191**, 653, 47-D13
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XVI. The Stellar Lyman- α Absorption Line. *Blair D. Savage and Robert J. Panek.* **191**, 659, 49-E5
- Filaments from the Galaxy NGC 1569. *Paul W. Hodge.* **191**, L21, 42-B7
- Formaldehyde Line Emission at 4.8 GHz near NGC 7538. *D. Downes and T. L. Wilson.* **191**, L77, 46-C5
- On the Theory of H_2 Rotational Excitation. *Lyman Spitzer, Jr., and Ellen Gould Zweibel.* **191**, L127, 49-B10
- Neutral Potassium in Dusty Clouds. *Barry L. Lutz.* **191**, L131, 49-C1
- Detection of Interstellar Methylamine. *N. Kaifu, M. Morimoto, K. Nagane, K. Akabane, T. Iguchi, and K. Takagi.* **191**, L135, 49-C5
- The Transparency of the Small Magellanic Cloud. *Paul W. Hodge.* **192**, 21, 50-B5
- The Fractional Ionization in Dense Interstellar Clouds. *M. Oppenheimer and A. Dalgarno.* **192**, 29, 50-B11
- Static Equilibria of the Interstellar Gas in the Presence of Magnetic and Gravitational Fields: Large-Scale Condensations. *Telemachos Ch. Mouschovias.* **192**, 37, 50-C5
- On the Velocity Dependence of the Interstellar $\text{Na I}/\text{Ca II}$ Ratio. *Richard S. Siluk and Joseph Silk.* **192**, 51, 50-D4
- Oscillator Strengths for Neutral Sodium and the Interstellar Sodium Abundance in Zeta Ophiuchi. *Peter Erman, J. Brzozowski, and Wm. Hayden Smith.* **192**, 59, 50-D11
- Comparison of the Optical Spectrum of the Filaments with the Spectrum of the Central Region of M82. *Natarajan Visvanathan.* **192**, 319, 54-F11
- Radio Recombination Lines at a Wavelength of 78 Centimeters. *Kurtiss J. Gordon, Courtney P. Gordon, and Felix J. Lockman.* **192**, 337, 55-A4
- Compact Infrared Sources Associated with Southern H II Regions. *Jay A. Frogel and S. Eric Persson.* **192**, 351, 55-B4
- The Structure of an $\text{H I}-\text{H II}$ Boundary. *A. K. Macpherson.* **192**, 369, 55-C11
- Optical Interstellar Lines in Dark Clouds. II. K I and Ultraviolet Sodium Lines. *Judith G. Cohen.* **192**, 379, 55-D7
- The Evolution of Supernova Remnants. II. Models of an Explosion in a Plane-stratified Medium. *Roger A. Chevalier and John Gardner.* **192**, 457, 56-C4
- Galactic Evolution and the Formation of the Light Elements. *Jean Audouze and Beatrice M. Tinsley.* **192**, 487, 56-E5
- Chemical Heating of Interstellar Clouds. *A. Dalgarno and M. Oppenheimer.* **192**, 597, 59-B13
- The X-Ray Spectra of the Vela and Puppis Supernova Remnants and the Shock-Wave Model of Supernova Remnants. *Paul Gorenstein, Frank R. Harnden, Jr., and Wallace H. Tucker.* **192**, 661, 59-G4
- A Possible Identification of the 10-Micron "Silicate" Feature. *Kenrick L. Day.* **192**, L15, 53-B1
- Hydrogen Chloride in Dense Interstellar Clouds. *A. Dalgarno, T. de Jong, M. Oppenheimer, and J. H. Black.* **192**, L37, 53-C7
- The Intensity Distribution of Diffuse Galactic H- α Emission. *R. J. Reynolds, F. L. Roesler, and F. Scherb.* **192**, L53, 57-E2
- Models of Massive Molecular Clouds. *B. Zuckerman and N. J. Evans II.* **192**, L149, 62-A1
- Dark Nebulae in the Magellanic Clouds. *Sidney van den Bergh.* **193**, 63, 63-E9
- Further Observations at the Interstellar Deuterium Frequency. *Jay M. Pasachoff and Diego A. Cesarsky.* **193**, 65, 63-E13
- Model Calculations for Diffuse Molecular Clouds. *A. E. Glassgold and William D. Langer.* **193**, 73, 63-F5
- On the Ultraviolet Radiation in the Galaxy. *Yervant Terzian.* **193**, 93, 63-G10
- Weak Interstellar Lines in the Visible Spectrum of Zeta Ophiuchi. *S. Shulman, V. J. Bortolot, and P. Thaddeus.* **193**, 97, 64-A1
- VLB Observations of the Crab Nebula and the Wavelength Dependence of Interstellar Scattering. *R. L. Mutel, J. J. Broderick, T. D. Carr, M. Lynch, M. Desch, W. W. Warnock, and W. K. Klemperer.* **193**, 279, 65-F9
- Infrared Observations of the Radio Source G30.8-0.0 in the W43 Complex. *Judith L. Pipher, G. L. Grasdalen, and Baruch T. Soifer.* **193**, 283, 65-F13
- A Study of Birefringence in the Interstellar Medium in the Direction of the Crab Nebula. *P. G. Martin and J. R. P. Angel.* **193**, 343, 67-D9
- Observations of Helium in the Interplanetary/Interstellar Wind: The Solar-Wake Effect. *C. S. Weller and R. R. Meier.* **193**, 471, 68-F13
- The Structure and Stability of Shock Waves in a Multiphase Interstellar Medium. *Stuart L. Mufson.* **193**, 561, 70-E2

Interstellar Matter — Continued

- On the Interstellar Abundance of the CH⁺ Radical. *J. Brzozowski, N. Elander, P. Erman, and M. Lyrra.* **193**, 741, 72-D1
- Column Densities of Interstellar Molecular Hydrogen. *Lyman Spitzer, Jr., William D. Cochran, and Alan Hirshfield.* **193**, 759, 72-E4; Suppl. **28**, 373 (No. 266)
- Low-Density Ionized Interstellar Gas as Revealed by Interstellar Optical and H I Radio Lines. *Carl Heiles.* **193**, L31, 66-C3
- Interstellar Abundances toward Zeta Ophiuchi. *Donald C. Morton.* **193**, L35, 66-C6
- A Survey with *Copernicus* of Interstellar O VI Absorption. *Edward B. Jenkins and Debra Anne Meloy.* **193**, L121, 72-G1
- Highly Ionized Atoms Observed with *Copernicus*. *Donald G. York.* **193**, L127, 72-G6
- Observations of Features in the Soft X-Ray Background Flux. *F. O. Williamson, W. T. Sanders, W. L. Kraushaar, D. McCammon, R. Borken, and A. N. Bunner.* **193**, L133, 73-A1
- 20 to 40 Micron Spectroscopy of the Orion Nebula. *J. R. Houck, D. F. Schaak, and R. A. Reed.* **193**, L139, 73-A7
- Interstellar Lines in Stars at High Galactic Latitudes. *J. G. Cohen.* **194**, 37, 74-D4
- The Interstellar Wake of the Solar Wind. *G. Yu.* **194**, 187, 75-G13
- An Experimental Test of the Homogeneity of the Interstellar Medium. *P. L. Baker.* **194**, 271, 77-E8
- Diffuse Interstellar Band Formation in Dense Clouds. *Theodore P. Snow, Jr., and Judith G. Cohen.* **194**, 313, 78-B2
- On the Relationship of OH and Formaldehyde with Interstellar Extinction. *B. E. Turner and C. E. Heiles.* **194**, 525, 80-C11
- Collapsing Molecular Clouds? *Robert B. Loren, William L. Peters, and Paul A. Vanden Bout.* **194**, L103, 81-A1
- Fine-Scale Structure of a Cold Hydrogen Layer. *P. L. Baker.* **194**, L109, 81-A6
- Interstellar Molecules**
- Discovery and CO Observations of a New Molecular Source near M17. *Charles Lada, Dale F. Dickinson, and Hays Pendleton.* **189**, L35, 21-B4
- A Strong Water Maser Associated with a Herbig-Haro Object. *Dale F. Dickinson, Gabriel Kojoian, and Stephen E. Strom.* **194**, L93, 80-G4
- Interstellar Reddening**
- Spectroscopic Comparison of Open Clusters. I. The Reddening, Blanketing, and Metallicity of M67. *Don C. Barry and Richard H. Cromwell.* **187**, 107, 2-A11
- Interstellar Polarization from a Medium with Changing Grain Alignment. *P. G. Martin.* **187**, 461, 7-C10
- Interstellar Circular Polarization: A Report of Eight New Positive Results. *J. J. Michalsky, Jr., J. B. Swedlund, R. A. Stokes, and R. W. Avery.* **187**, L13, 3-B11
- The Energy Distribution of the Very Red Star in NGC 6231. *R. Schild, J. B. Oke, and L. Searle.* **188**, 71, 10-F4
- Spectrophotometric Observations of the Compact H II Region K3-50 and of NGC 6857. *S. Eric Persson and Jay A. Frogel.* **188**, 523, 16-F9
- Radio-Continuum Measurements of Planetary Nebulae at 15.5 GHz. *Gopal Sistla, G. Kojoian, and E. J. Chaisson.* **192**, 165, 51-E1
- Ultraviolet Television Data from the Orbiting Astronomical Observatory. II. Stellar Ultraviolet Colors and Interstellar Extinction. *Eric Peytremann and Robert J. Davis.* **192**, 815, 61-C12; Suppl. **28**, 211 (No. 260)
- An Infrared Study of NGC 2024. *G. L. Grasdalen.* **193**, 373, 67-F12
- Ionization:** see **Atomic Processes**
- Jupiter**
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIII. The Albedos of Jupiter, Uranus, and Neptune. *Blair D. Savage and John J. Caldwell.* **187**, 197, 2-G8
- Raman Scattering from H₂ in Jupiter. *H. Fast, R. Poekert, and J. R. Auman.* **187**, 403, 5-F13
- Ammonia Absorption Relevant to the Albedo of Jupiter. II. Interpretation. *Martin G. Tomasko.* **187**, 641, 9-B5
- Jupiter: Identification of Ethane and Acetylene. *S. T. Ridgway.* **187**, L41, 3-D9
- High-Resolution Spectra of Sodium Emission from Io. *Robert A. Brown and Frederic H. Chaffee, Jr.* **187**, L125, 9-F1
- Sodium Emission from Io: Implications. *Michael B. McElroy, Yuk Ling Yung, and Robert A. Brown.* **187**, L127, 9-F3
- Radiative-Dynamical Equilibrium States for Jupiter. *L. M. Trafton and P. H. Stone.* **188**, 649, 18-A10
- Five-Micron Pictures of Jupiter. *J. A. Westphal, Keith Matthews, and Richard J. Terrile.* **188**, L111, 18-E6
- Stably Trapped Proton Fluxes in the Jovian Magnetosphere. *F. V. Coroniti, C. F. Kennel, and R. M. Thorne.* **189**, 383, 24-B13
- The Occultation of Beta Scorpii by Jupiter. II. The Hydrogen-Helium Abundance in the Jovian Atmosphere. *J. L. Elliot, L. H. Wasserman, J. Everhart, Carl Sagan, and W. Liller.* **190**, 719, 37-C6
- The Spatial Extent of Sodium Emission around Io. *L. Trafton, T. Parkinson, and W. Macy, Jr.* **190**, L85, 34-A8
- Implications of the *Pioneer 10* Measurements of the Jovian Magnetic Field for Theories of Io-modulated Decametric Radiation. *Robert A. Smith and C. S. Wu.* **190**, L91, 34-A13
- Energetic Electrons in Jupiter's Magnetosphere. *F. V. Coroniti.* **191**, 287, 41-G1; Suppl. **27**, 261 (No. 244)
- The Position and Stokes Parameters of the Integrated 21-Centimeter Radio Emission of Jupiter and their Variation with Epoch and Central Meridian Longitude. *Glenn L. Berge.* **191**, 775, 48-F5
- Jupiter Emission Observed near 1 MHz. *Larry W. Brown.* **192**, 547, 57-B8
- Sodium D-Line Emission from Io: Sputtering and Resonant Scattering Hypothesis. *Dennis L. Matson, Torrence V. Johnson, and Fraser P. Fanale.* **192**, L43, 53-D1
- Hydrocarbon Abundances in the Jovian Atmosphere. *Darrell F. Strobel.* **192**, L47, 53-D5
- Jupiter: Identification of Ethane and Acetylene (Erratum). *S. T. Ridgway.* **192**, L51, 53-D8
- The Thermal Structure of the Atmosphere of Jupiter. *L. Wallace, Michael Prather, and Michael J. S. Belton.* **193**, 481, 68-G9
- Structure of the Jovian Envelope from *Pioneer 10* Gravity Data. *J. D. Anderson, W. B. Hubbard, and W. L. Slattery.* **193**, L149, 73-B3
- Spectroscopic Observations of Io. *Yu. Mekler and A. Eviatar.* **193**, L151, 73-B5
- Jupiter: A Comment on the 8- to 14-Micron Limb Darkening. *L. Trafton and R. Wildey.* **194**, 499, 80-B1
- Dekametric and Hectometric Observations of Jupiter from the RAE-1 Satellite. *Michael D. Desch and Thomas D. Carr.* **194**, L57, 76-G1
- Spectral Behavior of Jupiter near 1 MHz. *Larry W. Brown.* **194**, L159, 84-G4
- Kinetic Theory:** see **Gas Dynamics; Hydrodynamics**
- Late-Type Stars**
- Four Stellar-Diameter Measurements by a New Technique: Amplitude Interferometry. *D. G. Currie, S. L. Knapp, and K. M. Liewer.* **187**, 131, 2-C5
- A Comparison of the Straight-Mean, Harmonic-Mean, and Multiple-Picker Approximations for the Line Opacities in Cool Model Atmospheres. *Duane F. Carbon.* **187**, 135, 2-C9
- Time Variation of the H₂O Maser and Infrared Continuum in Late-Type Stars. *P. R. Schwartz, P. M. Harvey, and A. H. Barrett.* **187**, 491, 7-E9
- Veiling and the Presence of Circumstellar Gas and Dust in Some Infrared Stars. *Roberta M. Humphreys.* **188**, 75, 10-F9
- Free-free and Free-bound Emission in Low-Surface-Gravity Stars. *Robert C. Gilman.* **188**, 87, 10-G13

- Supernova: The Result of the Death Spiral of a White Dwarf into a Red Giant.** *Warren M. Sparks and Theodore P. Stecher.* **188**, 149, 11-E1
- The Occurrence of a Nonspherical Thermal Instability in Red Giant Stars.** *Douglas O. Richstone.* **188**, 327, 14-B6
- High-Resolution Spectra of Cool Stars in the 10- and 20-Micron Regions.** *Richard Treffers and Martin Cohen.* **188**, 545, 17-A1
- Are 2-Micron Absorptions and 11-Micron Emissions of M Stars Related?** *Theodore D. Fay, Jr.* **188**, 553, 17-A12
- Measurements of Magnetic Fields in Young Main-Sequence Stars.** *Ann Merchant Boesgaard.* **188**, 567, 17-B10
- High-Spectral-Resolution Measurements of the H I $\lambda\lambda$ 1216 and Mg II $\lambda\lambda$ 2800 Emissions from Arcturus.** *H. W. Moos, J. L. Linsky, R. C. Henry, and W. McClintock.* **188**, L93, 18-D5
- Infrared Fluxes, Spectral Types, and Temperatures for Very Cool Stars.** *H. M. Dyck, G. W. Lockwood, and R. W. Capps.* **189**, 89, 19-G7
- Cyanogen-Band Strengths of Giant Stars in 47 Tucanae.** *Robert D. McClure and Wayne Osborn.* **189**, 405, 25-A11
- The Old Open Cluster NGC 2420.** *Robert D. McClure, William T. Forrester, and James Gibson.* **189**, 409, 25-A14
- Intermediate-Band Photometry of M67.** *K. A. Janes.* **189**, 423, 25-C1
- Spectral Classification from Infrared Spectra of Moderate Dispersion.** *Henry Albers.* **189**, 463, 25-F1
- Carbon and Nitrogen Abundances in Metal-poor Stars.** *Christopher Sneden.* **189**, 493, 26-A4
- Observations of the Profile of the Ca II Infrared Triplet Line $\lambda\lambda$ 8498 in Late-Type Stars.** *Christopher M. Anderson.* **190**, 585, 35-G6
- The Carbon Monoxide Band Strength and $^{12}\text{C}/^{13}\text{C}$ Ratio in K Giants.** *Stephen T. Ridgway.* **190**, 591, 35-G12
- Models of Asymptotic-Giant-Branch Stars.** *P. R. Wood.* **190**, 609, 36-B1
- M Supergiants in the Large Magellanic Cloud.** *Roberta M. Humphreys.* **190**, L133, 37-G12
- Time Variations in the OH Microwave and Infrared Emission from Late-Type Stars.** *Paul M. Harvey, Kenneth P. Bechis, William J. Wilson, and John A. Ball.* **191**, 599, 46-A5; Suppl. **27**, 331 (No. 248)
- Spectroscopic Observations of Interesting Southern Stars Noted on Southern Objective-Prism Plates.** *C. B. Stephenson.* **191**, 685, 47-G4
- Starspots on Flare Stars.** *D. J. Mullan.* **192**, 149, 51-D1
- Strong-Line K Stars. I. Photometry.** *Valdar Oinas.* **192**, 233, 52-B13; Suppl. **27**, 391 (No. 250)
- Strong-Line K Stars. II. Chemical Abundances.** *Valdar Oinas.* **192**, 233, 52-B13; Suppl. **27**, 405 (No. 250)
- Spectral Types of M Dwarf Stars.** *Alfred H. Joy and Helmut A. Abt.* **192**, 237, 52-C1; Suppl. **28**, 1 (No. 252)
- Observed Departures from LTE in Stellar Fe I Lines. II. Arcturus.** *Myron A. Smith.* **192**, 623, 59-D9
- Physical Characteristics of Giant Stars in the Anomalous Globular Cluster NGC 362.** *Robert D. McClure and John Norris.* **193**, 139, 64-D1
- A Lower Limit on the $^{12}\text{C}/^{13}\text{C}$ Ratio in Alpha Herculis.** *Rodger I. Thompson and Harold L. Johnson.* **193**, 147, 64-D8
- Physical Characteristics of Giant Stars in the Draco Dwarf Spheroidal Galaxy.** *F. D. A. Hartwick and Robert D. McClure.* **193**, 321, 67-C3
- The Open Cluster NGC 7419 and its M7 Supergiant IRC + 60 375.** *William M. Fawley and Martin Cohen.* **193**, 367, 67-F3
- A Spectroscopic Study of YY Geminorum.** *Bernard W. Bopp.* **193**, 389, 67-G11
- Nucleation and Growth of Dust Grains.** *E. E. Salpeter.* **193**, 579, 70-F5
- Formation and Flow of Dust Grains in Cool Stellar Atmospheres.** *E. E. Salpeter.* **193**, 585, 70-F11
- The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. II. CN and CO in Alpha Orionis.** *D. L. Lambert, D. S. Dearborn, and C. Sneden.* **193**, 621, 71-B4
- The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. III. Alpha Tauri, Beta Geminorum, and Mu Leonis.** *J. Tomkin and D. L. Lambert.* **193**, 631, 71-C1
- Possible Abundance Differences among Giant Stars in NGC 188.** *Robert D. McClure.* **194**, 355, 78-E6
- Studies of Evolved Stars. IV. Band Strength Ratios as Indicators of Mixing in M, MS, and S Stars.** *John M. Scalo.* **194**, 361, 78-E12
- Visual and Infrared Observations of Late-Type Supergiants in the Southern Sky.** *R. M. Humphreys and E. P. Ney.* **194**, 623, 82-G8
- Limb Darkening, Planetary**
- Jupiter: A Comment on the 8- to 14-Micron Limb Darkening.** *L. Trafton and R. Wildey.* **194**, 499, 80-B1
- Limb Darkening, Solar**
- Limits to Solar Limb Darkening at a Wavelength of 1.4 Millimeters Derived from Antenna-Beam Parameters.** *P. A. R. Ade, J. D. G. Rather, and P. E. Clegg.* **187**, 389, 5-E13
- Line Formation**
- Formation of the Luminosity-sensitive O I Multiplet at 7774 Å.** *H. R. Johnson, R. W. Milkey, and L. W. Ramsey.* **187**, 147, 2-D7
- An Explanation of the Solar Limb Shift.** *Michael H. Hart.* **187**, 393, 5-F4
- Transfer of Resonance-Line Radiation in Differentially Expanding Atmospheres. III. Formation of PCygni-Type Lines by a Doublet Line or Two Partially "Blended" Lines.** *Thomas G. Hewitt and Peter D. Noerdlinger.* **188**, 315, 14-A8
- On Spatial Variations in the Intensity of Chromospheric Ha.** *K. B. Gebbie and R. Steinitz.* **188**, 399, 14-G6
- Formation of Coupled Spectral Lines in a Planetary Atmosphere.** *J. W. Chamberlain and L. Wallace.* **190**, 487, 33-D7
- Theoretical Helium I Emission-Line Intensities for Quiescent Prominences.** *J. N. Heasley, Dimitri Mihalas, and A. I. Poland.* **192**, 181, 51-F4
- Monte Carlo Simulation of Emission Frequencies from Partial Frequency Redistribution Functions.** *Jong-Sen Lee.* **192**, 465, 56-C11
- Resonance-Line Transfer with Partial Redistribution. II. The Solar Mg II Lines.** *R. W. Milkey and Dimitri Mihalas.* **192**, 769, 60-G8
- Sodium D-Line Emission from Io: Sputtering and Resonant Scattering Hypothesis.** *Dennis L. Matson, Torrence V. Johnson, and Fraser P. Fanale.* **192**, L43, 53-D1
- On the Spectrum of Neutral Oxygen in the Orion Nebula.** *Guido Münch and Keith Taylor.* **192**, L93, 57-G10
- On QSO and Seyfert Galaxy Line-Emission Models.** *Gordon M. Mac Alpine.* **193**, 37, 63-C12
- A Simplified Method for Calculation of Radiative Energy Loss Due to Spectral Lines.** *Richard C. Canfield.* **194**, 483, 79-G3
- Analysis of the Solar Magnesium I Spectrum.** *Richard C. Alcock and Richard C. Canfield.* **194**, 733, 84-A3
- Line Identifications**
- Infrared Spectra of γ^2 Velorum and ζ Puppis.** *T. G. Barnes, D. L. Lambert, and A. E. Potter.* **187**, 73, 1-F1
- A Theoretical and Experimental Study of Fe xix to Fe xxiv Solar-Flare Spectra and Isoelectronic Spectra in Sulfur.** *B. C. Fawcett, R. D. Cowan, and R. W. Hayes.* **187**, 377, 5-E3
- Laser-Plasma Spectra of Highly Ionized Fluorine.** *U. Feldman, G. A. Doschek, D. J. Nagel, W. E. Behring, and R. D. Cowan.* **187**, 417, 5-G11
- Microwave Spectrum of ^{13}C Methanol.** *S. S. Haque, R. M. Lees, J. M. Saint Clair, Yardley Beers, and Donald R. Johnson.* **187**, L15, 3-B13
- Autoionization Spectra of Beryllium (Be I and Be II) in the 110- to 140-eV Energy Range.** *G. Mehlman and J. M. Esteva.* **188**, 191, 12-A1
- The Spectra of S XIII and S XIV in the Region 25-40 Å.** *S. Goldsmith, L. Oren, and Leonard Cohen.* **188**, 197, 12-A9

Line Identifications — Continued

- Is X-ogen HCO⁺? *Eric Herbst and William Klemperer*. **188**, 255, 13-D6
- Transitions $2s^2 2p^k - 2s 2p^{k+1}$ of the F I, O I, and N I Isoelectronic Sequences. *G. A. Doschek, U. Feldman, R. D. Cowan, and Leonard Cohen*. **188**, 417, 15-B1
- Relative Coronal Abundances Derived from X-Ray Observations. I. Sodium, Magnesium, Aluminum, Silicon, Sulfur, and Argon. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **188**, 423, 15-B9
- On the Identification of the 6420 Å Absorption Feature in the Spectra of Uranus and Neptune. *Tobias Owen, Barry L. Lutz, Carolyn C. Porco, and Jerry H. Woodman*. **189**, 379, 24-B10
- Selected Line Identifications in the Ultraviolet Spectrum of Gamma Equulei. *Saul J. Adelman*. **190**, 743, 37-E1; Suppl. **27**, 183 (No. 242)
- The Peculiar A Star HD 215441. *Saul J. Adelman*. **190**, 743, 37-E1; Suppl. **27**, 203 (No. 242)
- The Fundamental Rotation-Vibration Band of TiO. *John G. Phillips*. **191**, 597, 46-A4; Suppl. **27**, 319 (No. 247)
- The Ultraviolet Spectrum of Eta Canis Majoris, B5 Ia. *Anne B. Underhill*. **191**, 601, 46-A6; Suppl. **27**, 359 (No. 249)
- Beam Maser Measurements of CH₃OH Rotational Transitions. *Linda Gaines, K. H. Casleton, and S. G. Kukolich*. **191**, L99, 46-E1
- Is H I a Source in Diffuse Interstellar Lines? *E. Herbst, T. A. Patterson, D. W. Norcross, and W. C. Lineberger*. **191**, L143, 49-C11
- Some Properties of H₂CN⁺: A Potentially Important Interstellar Species. *Peter K. Pearson and Henry F. Schaefer III*. **192**, 33, 50-C1
- Relative Coronal Abundances Derived from X-Ray Observations. II. Nitrogen, Oxygen, Neon, Magnesium, and Iron. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **192**, 169, 51-E5
- Electronic Transitions of the ZrO Molecule: Triplet Systems. *L. Schoonveld and S. Sundaram*. **192**, 207, 52-A1
- The Peculiar A Star HD 200311: A Photographic-Region Line-Identification Study. *Saul J. Adelman*. **192**, 573, 57-D5; Suppl. **28**, 51 (No. 254)
- V1016 Cygni: Spectral Observations 1969-1973. *M. Pim FitzGerald and Andrea Pilavaki*. **192**, 575, 57-D7; Suppl. **28**, 147 (No. 258)
- A Search for Neutral Iron Lines in a Centauri. *John Norris and Bodo Baschek*. **193**, 133, 64-C8
- Small Silicon Molecules: Possible Sources of the Unidentified Molecular Lines U81.5, U86.2, U89.2, and U90.7. *Frank J. Lovas*. **193**, 265, 65-E9
- An Analysis of the Spectrum of the Large-Redshift Quasi-stellar Object QQ 172. *J. A. Baldwin, E. M. Burbidge, G. R. Burbidge, C. Hazard, L. B. Robinson, and E. J. Wampler*. **193**, 513, 70-A11
- Autoionization Spectra of Magnesium (Mg I, Mg II, and Mg III) in the 50- to 110-eV Energy Range. *J. M. Esteva and G. Mehlman*. **193**, 747, 72-D7
- Evidence for a Corona of Beta Geminorum. *Humberto Gerola, Jeffrey L. Linsky, Richard Shine, W. McClintock, R. C. Henry, and H. W. Moos*. **193**, L107, 72-F1
- Rocket-Ultraviolet Spectra of Kappa, Lambda, Tau, and Upsilon Scorpii. *Edward B. Jenkins, Donald C. Morton, and Donald G. York*. **194**, 77, 74-G1
- Element Identifications in Five Ap Stars. *Charles R. Cowley, Mark R. Hartoog, and Anne P. Cowley*. **194**, 343, 78-D5
- Relative Coronal Abundances Derived from X-Ray Observations. III. The Effect of Cascades on the Relative Intensity of Fe XVII Line Fluxes, and a Revised Iron Abundance. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **194**, 471, 79-F5
- Silicon Carbide: Its Ground State and Predicted Spectrum. *Barry L. Lutz and James A. Ryan*. **194**, 753, 84-B8
- Line Profiles**
- Monte Carlo Simulation of Voigt Distribution in Photon-Diffusion Problems. *Jong-Sen Lee*. **187**, 159, 2-E4
- High-Resolution Spectra of Sodium Emission from Io. *Robert A. Brown and Frederic H. Chaffee, Jr.* **187**, L125, 9-F1
- *On the Interpretation of the Magnetic Curves of the Ap Stars as Determined by the Photographic Technique. *Ermanno F. Borra*. **188**, 287, 13-F9
- Rotational Distortion of Stellar Absorption Lines. I. Parameters from Photographic Spectra. *Thomas R. Stoeckley and Charles S. Morris*. **188**, 579, 17-C6
- Stellar Spectral Synthesis in the Ultraviolet. *Robert L. Kurucz*. **188**, L21, 12-D6
- Interferometric Scans of Interstellar K I Lines. *L. M. Hobbs*. **188**, L67, 15-F5
- High-Spectral-Resolution Measurements of the H I λ 1216 and Mg II λ 2800 Emissions from Arcturus. *H. W. Moos, J. L. Linsky, R. C. Henry, and W. McClintock*. **188**, L93, 18-D5
- The Absorption-Line Spectrum of NGC 4151. *Kurt S. Anderson*. **189**, 195, 22-C2
- Profiles of Emission Lines in Be Stars. III. Further Study of the Long-Period V/R Variation. *Elise Albert and Su-Shu Huang*. **189**, 479, 25-G5
- Solar Coronal Line Profiles in the Extreme-Ultraviolet. *U. Feldman and W. E. Behring*. **189**, L45, 21-C1
- Astrophysical Masers. IV. Line Widths. *Peter Goldreich and John Kwan*. **190**, 27, 28-C1
- The Doppler Splitting of Spectral Lines in Pulsating Stars. *Angelo James Skalafuris*. **190**, 91, 28-G10
- He I λ 4471 Profiles in B Stars: Calculations with an Improved Line-broadening Theory. *Dimitri Mihalas, A. J. Barnard, J. Cooper, and E. W. Smith*. **190**, 315, 31-F6
- Photoelectric Profile Measurement of Hα and Hβ in Be Stars. *David F. Gray and J. M. Marlborough*. **190**, 505, 33-E7; Suppl. **27**, 121 (No. 240)
- Observations of the Profile of the Ca II Infrared Triplet Line λ 4949 in Late-Type Stars. *Christopher M. Anderson*. **190**, 585, 35-G6
- The Widths of the Solar He I and He II Lines at 584, 537, and 304 Å. *G. A. Doschek, W. E. Behring, and U. Feldman*. **190**, L141, 38-A5
- Scattering in the Shell of Eta Carinae. *Eric R. Craine*. **191**, 105, 40-B1
- Calculation of Theoretical Rotational Line Profiles for the Determination of $v \sin i$ in the Spectral Range O9-F8. *George W. Collins II*. **191**, 157, 40-E3
- The Interpretation of Broad Emission Lines in High-Redshift QSOs. *Ronald E. Stoner, Roger Ptak, and David Ellis*. **191**, 291, 43-A4
- A Comparison of Interstellar Na I, Ca II, and K I Absorption. *L. M. Hobbs*. **191**, 381, 43-G6
- Statistical Properties of Interstellar Clouds. *L. M. Hobbs*. **191**, 395, 44-A7
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XVI. The Stellar Lyman-Alpha Absorption Line. *Blair D. Savage and Robert J. Panek*. **191**, 659, 47-E5
- Rapid Line Variability. I. The Ap Stars Epsilon Ursae Majoris and 73 Draconis. *Michel Breger*. **192**, 71, 50-E14
- Stellar Model Chromospheres. II. Procyon (F5 IV-V). *Thomas R. Ayres, Jeffrey L. Linsky, and Richard A. Shine*. **192**, 93, 50-G7
- Strong-Line K Stars. I. Photometry. *Valdar Oinas*. **192**, 233, 52-B13; Suppl. **27**, 391 (No. 250)
- Strong-Line K Stars. II. Chemical Abundances. *Valdar Oinas*. **192**, 233, 52-B13; Suppl. **27**, 405 (No. 250)
- Harmonic Analysis of the Line Profiles of an Oblique Rotator. *Alfred E. Falk and William H. Wehran*. **192**, 409, 55-F13
- High-Dispersion Spectroscopy of the Sigma Orionis System. *C. T. Bolton*. **192**, L7, 53-A9
- The Dispersal of the Shell of Zeta Ophiuchi. *Paul K. Barker and Timothy Brown*. **192**, L11, 53-A12
- Models of Massive Molecular Clouds. *B. Zuckerman and N. J.*

- Evans II.** 192, L149, 62-A1
- Spectroscopic Observations of O-Type Stars. V. The Hydrogen Lines and $\lambda\lambda 4686$ He II.** *Peter S. Conti and Eva M. Leep.* 193, 113, 64-B2
- Hydrogen and Helium Features in Magnetic White Dwarfs. S. B. Kemic. 193, 213, 65-B2**
- Transfer of Line Radiation in Differentially Expanding Atmospheres. IV. The Two-Level Atom in Plane-parallel Geometry Solved by the Feautrier Method.** *Peter D. Noerdlinger and George B. Rybicki.* 193, 651, 71-D5
- Spectral Changes Induced by the Zeeman Effect in Oblique Rotator Models.** *Ermanno F. Borra.* 193, 699, 72-A1
- Collapsing Molecular Clouds?** *Robert B. Loren, William L. Peters, and Paul A. Vanden Bout.* 194, L103, 81-A1
- Long-Period Variables**
- Infrared Variability of V1016 Cygni. *Paul M. Harvey.* 188, 95, 11-A7
 - Infrared Fluxes, Spectral Types, and Temperatures for Very Cool Stars. *H. M. Dyck, G. W. Lockwood, and R. W. Capps.* 189, 89, 19-G7
 - Models of Asymptotic-Giant-Branch Stars. *P. R. Wood.* 190, 609, 36-B1
 - Time Variations in the OH Microwave and Infrared Emission from Late-Type Stars. *Paul M. Harvey, Kenneth P. Bechis, William J. Wilson, and John A. Ball.* 191, 599, 46-A5; Suppl. 27, 331 (No. 248)
 - Angular Diameter of IRC+10011 at 2.2, 10, and 20 Microns. *R. R. Zappala, E. E. Becklin, K. Matthews, and G. Neugebauer.* 192, 109, 51-A8
 - Two Mira Variables in the Stellar System Terzan 5. *Hyron Spinrad, Malcolm G. Smith, and Eugene Harlan.* 192, 405, 55-F8
 - Studies of Hydrodynamic Events in Stellar Evolution. III. Ejection of Planetary Nebulae. *G. S. Kutter and Warren M. Sparks.* 192, 447, 56-B9
 - Revised Catalog of Spectra of Mira Variables of Types Me and Se. *Philip C. Keenan, Robert F. Garrison, and Armin J. Deutsch.* 193, 289, 65-G5; Suppl. 28, 271 (No. 262)
 - Studies of Evolved Stars. IV. Band Strength Ratios as Indicators of Mixing in M, MS, and S Stars. *John M. Scalo.* 194, 361, 78-E12
- Luminosities**
- A Note on the Use of the Strength of the Si II Doublet $\lambda\lambda 6347, 6371$ as a Luminosity Indicator in B9-A2 Supergiants. *Jeffrey D. Rosenthal.* 187, 261, 4-D4
 - NGC 2287 and the Pleiades Group. *O. J. Eggen.* 188, 59, 10-E3
 - The Luminosities of Population II Cepheids. *Erika Böhm-Vitense.* 188, 571, 17-B13
 - Mean Absolute Magnitudes of Carbon Stars and Related Objects. *John H. Baumert.* 190, 85, 28-G4
 - Observations of the Profile of the Ca II Infrared Triplet Line $\lambda 8498$ in Late-Type Stars. *Christopher M. Anderson.* 190, 585, 35-G6
 - Steps toward the Hubble Constant. II. The Brightest Stars in Late-Type Spiral Galaxies. *Allan Sandage and G. A. Tammann.* 191, 603, 47-A4
 - Spectral Types of M Dwarf Stars. *Alfred H. Joy and Helmut A. Abt.* 192, 237, 52-C1; Suppl. 28, 1 (No. 252)
 - The Distance to the Hyades Cluster from R-I Photometry. *A. R. Upgren.* 193, 359, 67-E9
 - Masses and Luminosities of Population II Cepheids. *E. Böhm-Vitense, P. Szkody, G. Wallerstein, and Icko Iben, Jr.* 194, 125, 75-C6
- Luminosity Functions: see Stellar Statistics**
- Luminous Stars**
- A Note on the Use of the Strength of the Si II Doublet $\lambda\lambda 6347, 6371$ as a Luminosity Indicator in B9-A2 Supergiants. *Jeffrey D. Rosenthal.* 187, 261, 4-D4
 - Lines of Neutral Barium and the Abundance of Barium in Two K Supergiants. *A. R. Hyland and J. R. Mould.* 187, 277, 4-E5
 - Spectroscopic Studies of O-Type Stars. IV. Lines in the Red Region. *Peter S. Conti.* 187, 539, 8-B4
 - Veiling and the Presence of Circumstellar Gas and Dust in Some Infrared Stars. *Roberta M. Humphreys.* 188, 75, 10-F9
 - Free-free and Free-bound Emission in Low-Surface-Gravity Stars. *Robert C. Gilman.* 188, 87, 10-G13
 - FG Sagittae: The s-Process Episode. *G. E. Langer, Robert P. Kraft, and Kurt S. Anderson.* 189, 509, 26-B5
 - Infrared Stars in Binary Systems. *Roberta M. Humphreys and E. P. Ney.* 190, 339, 32-A1
 - Optical Observations of HD 77581 and a Model for the System HD 77581-2U 0900-40. *Larry D. Petro and W. A. Hiltner.* 190, 661, 36-F7
 - Time Variations in the OH Microwave and Infrared Emission from Late-Type Stars. *Paul M. Harvey, Kenneth P. Bechis, William J. Wilson, and John A. Ball.* 191, 599, 46-A5; Suppl. 27, 331 (No. 248)
 - The Ultraviolet Spectrum of Eta Canis Majoris, B5 Ia. *Anne B. Underhill.* 191, 601, 46-A6; Suppl. 27, 359 (No. 249)
 - Steps toward the Hubble Constant. II. The Brightest Stars in Late-Type Spiral Galaxies. *Allan Sandage and G. A. Tammann.* 191, 603, 47-A4
 - Near-Infrared Photometry of Unidentified IRC Stars. II. *G. W. Lockwood.* 192, 113, 51-A12
 - The OB Stellar Associations in the Large Magellanic Cloud. *Peter B. Lucke.* 192, 573, 57-D5; Suppl. 28, 73 (No. 255)
 - Stellar Energy Distributions in an Infrared Cluster in Ara. *G. W. Lockwood.* 193, 103, 64-A7
 - The Open Cluster NGC 7419 and its M7 Supergiant IRC +60 375. *William M. Fawley and Martin Cohen.* 193, 367, 67-F3
 - Infrared Photometry of High-Luminosity Supergiants Earlier than M and the Interstellar Extinction Law. *J. A. Hackwell and R. D. Gehrz.* 194, 49, 74-E2
 - Steps toward the Hubble Constant. III. The Distance and Stellar Content of the M101 Group of Galaxies. *Allan Sandage and G. A. Tammann.* 194, 223, 77-A12
 - Visual and Infrared Observations of Late-Type Supergiants in the Southern Sky. *R. M. Humphreys and E. P. Ney.* 194, 623, 82-G8
- Lunar Occultation**
- Period Variation of the Cepheid Zeta Geminorum. *Helmut A. Abt and Saul G. Levy.* 188, L75, 15-F11
 - Angular Diameter of IRC+10011 at 2.2, 10, and 20 Microns. *R. R. Zappala, E. E. Becklin, K. Matthews, and G. Neugebauer.* 192, 109, 51-A8
 - Lunar Occultation Summary. I. *J. J. Eitter and W. I. Beavers.* 194, 213, 76-B11; Suppl. 28, 405 (No. 269)
- Magellanic Clouds**
- The Galactic Orbit of the Old Open Cluster NGC 2420. *D. W. Keenan and K. A. Innanen.* 189, 205, 22-C11
 - Differences between the Evolutionary Tracks of Young Stars in the Galaxy and in the Magellanic Clouds. *Gretchen L. Hagen and Sidney van den Bergh.* 189, L103, 27-C5
 - The Magellanic Stream. *D. S. Mathewson, M. N. Cleary, and J. D. Murray.* 190, 291, 31-D9
 - M Supergiants in the Large Magellanic Cloud. *Roberta M. Humphreys.* 190, L133, 37-G12
 - Core-Helium-Burning Stars in Young Clusters in the Large Magellanic Cloud. *J. W. Robertson.* 191, 67, 39-F6
 - X-Ray Observations of the Large Magellanic Cloud by the Copernicus Satellite. *C. G. Rapley and I. R. Tuohy.* 191, L113, 49-A13
 - The Transparency of the Small Magellanic Cloud. *Paul W. Hodge.* 192, 21, 50-B5
 - The OB Stellar Associations in the Large Magellanic Cloud. *Peter B. Lucke.* 192, 573, 57-D5; Suppl. 28, 73 (No. 255)
 - Dark Nebulae in the Magellanic Clouds. *Sidney van den Bergh.* 193, 63, 63-E9
 - Chemical Composition of H II Regions in the Large Magellanic Cloud and its Cosmological Implications. *Manuel Peimbert and Silvia Torres-Peimbert.* 193, 327, 67-C8

Magnetic Fields

- The Transfer of Circularly Polarized Radiation. *George W. Collins II and Paul F. Buerger.* **187**, 163, 2-E7
- Comment on "Galactic Magnetic Fields: Cellular or Filamentary Structure?". *E. N. Parker.* **187**, 191, 2-G4
- Reply to "Comment on 'Galactic Magnetic Fields: Cellular or Filamentary Structure?'". *F. C. Michel.* **187**, 193, 2-G5
- Dynamical Stability of Stationary-Dynamo Magnetic Fields. *Eugene H. Levy.* **187**, 361, 5-D2
- Inverse Compton Radiation and the Magnetic Field in Clusters of Galaxies. *D. E. Harris and W. Romanishin.* **188**, 209, 13-A3
- Analytic Variational Calculation of the Ground-State Binding Energy of Hydrogen in Intermediate and Intense Magnetic Fields. *Lance W. Wilson.* **188**, 349, 14-C12
- Coherent Propagation of Charged-Particle Bunches in Random Magnetic Fields. *James A. Earl.* **188**, 379, 14-F1
- Measurements of Magnetic Fields in Young Main-Sequence Stars. *Ann Merchant Boesgaard.* **188**, 567, 17-B10
- Structure of the Local Galactic Magnetic Field. *R. N. Manchester.* **188**, 637, 17-G12
- Turbulence-enhanced Synchrotron Radiation in the Galaxy. *R. Cowsik and J. Mitteldorf.* **189**, 51, 19-D12
- Effect of Faraday Rotation on the Circular Polarization of the Crab Nebula. *Michael J. Gerver.* **189**, 249, 22-F13
- Pulsar Magnetic Axis Alignment and Counteralignment. *William W. Macy, Jr.* **190**, 153, 29-E1
- The Space-Time of Axisymmetric Gravitating Masses. *K. Y. Fu.* **190**, 411, 32-F2
- Energy Spectrum of Hydrogen-like Atoms in a Strong Magnetic Field. *G. L. Surmelian and R. F. O'Connell.* **190**, 741, 37-D13
- Implications of the *Pioneer-10* Measurements of the Jovian Magnetic Field for Theories of Io-modulated Decametric Radiation. *Robert A. Smith and C. S. Wu.* **190**, L91, 34-A13
- Magnetic Fields in the Orion Molecular Cloud from the Zeeman Effect in SO. *F. O. Clark and D. R. Johnson.* **191**, L87, 46-D1
- Static Equilibria of the Interstellar Gas in the Presence of Magnetic and Gravitational Fields: Large-Scale Condensations. *Telemachos Ch. Mouschovias.* **192**, 37, 50-C5
- DQ Herculis: Weak Sister to HZ Herculis. *D. Q. Lamb.* **192**, L129, 61-F11
- The Diffusive Idealization of Charged-Particle Transport in Random Magnetic Fields. *James A. Earl.* **193**, 231, 65-C4
- DQ Herculis: Periodic Circular Polarization Synchronous with the Rapid Light Variations. *John B. Swedlund, James C. Kemp, and Ramon D. Wolstencroft.* **193**, L11, 66-A12
- DQ Herculis: Periodic Linear Polarization Synchronous with the Rapid Light Variation. *James C. Kemp, John B. Swedlund, and Ramon D. Wolstencroft.* **193**, L15, 66-B1
- Gamma-Ray Bursts from Magnetic White Dwarfs. *G. Charnugam.* **193**, L75, 69-D6
- Pitch-Angle Scattering of Charged Particles in a Random Magnetic Field. *J. R. Jokipii.* **194**, 465, 79-E14
- Discovery of Magnetic DA White Dwarf. *J. R. P. Angel, R. F. Carswell, P. A. Strittmatter, E. A. Beaver, and R. Harms.* **194**, L47, 76-F6
- Magnetic Fields, Solar**
- Reply to "Comment on 'Galactic Magnetic Fields: Cellular or Filamentary Structure?'". *F. C. Michel.* **187**, 193, 2-G5
- Hydraulic Concentration of Magnetic Fields in the Solar Photosphere. II. Bernoulli Effect. *E. N. Parker.* **190**, 429, 32-G5
- Dynamics of the Solar Magnetic Field. I. Method of Examination of Force-free Magnetic Fields. *Y. Nakagawa.* **190**, 437, 33-A1
- Dynamics of the Solar Magnetic Field. II. The Energy Spectrum of Large-Scale Solar Magnetic Fields. *Y. Nakagawa and Randolph H. Levine.* **190**, 441, 33-A5
- A New Theory of Coronal Heating. *Randolph H. Levine.* **190**, 457, 33-B8
- Dynamics of the Solar Magnetic Field. III. Location of Solar-Flare Excitation and the Velocity Field Determined from Magnetograms. *Randolph H. Levine and Y. Nakagawa.* **190**, 703, 37-B6
- Dynamics of the Solar Magnetic Field. IV. Examples of Force-free Magnetic-Field Evolution in Response to Photospheric Motions. *Y. Nakagawa and K. Tanaka.* **190**, 711, 37-B13
- Research with Solar Satellites. *Leo Goldberg.* **191**, 1, 39-A4
- On the Nature of the Small-Scale Solar Magnetic Field. *G. A. Chapman.* **191**, 255, 41-D11
- The Dynamical Properties of Twisted Ropes of Magnetic Field and the Vigor of New Active Regions on the Sun. *E. N. Parker.* **191**, 245, 41-D1
- Sweet's Mechanism in the Solar Wind. *L. F. Burlaga and J. D. Scudder.* **191**, L149, 49-D3
- Magnetic Stars**
- Spectroscopic Observations of HD 153919 (2U 1700-37). *Sidney C. Wolff and Nancy D. Morrison.* **187**, 69, 1-E11
- The Variations of the Magnetic Ap Star 49 Camelopardalis. *Walter K. Bonsack, Catherine A. Pilachowski, and Sidney C. Wolff.* **187**, 265, 4-D7
- The Orientation of Magnetic Axes in Ap Stars: An Alternative Interpretation of the Component with Small Obliquity. *Ermanno F. Borra.* **187**, 271, 4-D13
- Rotating Magnetosphere: Far-Field Solutions. *F. Curtis Michel.* **187**, 585, 8-E7
- On the Interpretation of the Magnetic Curves of the Ap Stars as Determined by the Photographic Technique. *Ermanno F. Borra.* **188**, 287, 13-F9
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XV. The Strongly Magnetic Variable HD 215441. *David S. Leckrone.* **190**, 319, 31-F10
- The Extraordinarily Slow Magnetic Variation of Gamma Equulei. *Walter K. Bonsack and Catherine A. Pilachowski.* **190**, 327, 31-G4
- The Holmium Ap Star HD 51418. *Terry J. Jones, Sidney C. Wolff, and Walter K. Bonsack.* **190**, 579, 35-G2
- The Peculiar A Star HD 215441. *Saul J. Adelman.* **190**, 743, 37-E1; Suppl. **27**, 203 (No. 242)
- The Wavelength Dependence of Circular Polarization in GD 229. *J. D. Landstreet and J. R. P. Angel.* **190**, L25, 30-F1
- The Spectrum of the Polarized White Dwarf GD 229. *Jesse L. Greenstein, Maarten Schmidt, and Leonard Searle.* **190**, L27, 30-F3
- G240-72: A New Magnetic White Dwarf with Unusual Polarization. *J. R. P. Angel, P. Hintzen, P. A. Strittmatter, and P. G. Martin.* **190**, L71, 33-G9
- Magnetic Fields and Diffusion Processes in Peculiar A Stars. *Steven N. Shore and Saul J. Adelman.* **191**, 165, 40-E11
- A Determination by the Zeeman Effect of the Magnetic Field Strength in the White Dwarf G99-37. *J. R. P. Angel and J. D. Landstreet.* **191**, 457, 44-E12
- Starspots on Flare Stars. *D. J. Mullan.* **192**, 149, 51-D1
- Harmonic Analysis of the Line Profiles of an Oblique Rotator. *Alfred E. Falk and William H. Wehlau.* **192**, 409, 55-F13
- The Peculiar A Star HD 200311: A Photographic-Region Line-Identification Study. *Saul J. Adelman.* **192**, 573, 57-D5; Suppl. **28**, 51 (No. 254)
- Rotating Magnetospheres: Acceleration of Plasma from the Surface. *F. Curtis Michel.* **192**, 713, 60-C10
- Hydrogen and Helium Features in Magnetic White Dwarfs. *S. B. Kemic.* **193**, 213, 65-B2
- Spectral Changes Induced by the Zeeman Effect in Oblique Rotator Models. *Ermanno F. Borra.* **193**, 699, 72-A1
- Quadratic Zeeman Effect in the Hydrogen Balmer Lines from Magnetic White Dwarfs. *G. L. Surmelian and R. F. O'Connell.* **193**, 705, 72-A6
- Spectrophotometry of Magnetic Degenerate Stars. *Jesse L. Greenstein.* **194**, L51, 76-F10
- Magnetohydrodynamics: see Hydromagnetics**
- Mars**
- Radiative Transfer within the Mesospheres of Venus and Mars. *V. Ramanathan and R. D. Cess.* **188**, 407, 15-A5

- Infrared Observations of Phobos from *Mariner 9*. *I. Gately, H. Kieffer, E. Miner, and G. Neugebauer.* **190**, 497, 33-E2
- Masers**
- Time Variation of the H₂O Maser and Infrared Continuum in Late-Type Stars. *P. R. Schwartz, P. M. Harvey, and A. H. Barrett.* **187**, 491, 7-E9
 - Detection of Possible Maser Emission near 3.4 Millimeters from an Unidentified Molecular Species in Orion. *L. E. Snyder and D. Buhl.* **189**, L31, 21-B1
 - Astrophysical Masers. IV. Line Widths. *Peter Goldreich and John Kwan.* **190**, 27, 28-C1
 - Observational Evidence for the Excitation of HCN and H₂O in Protostellar Molecular Clouds. *Frank O. Clark, David Buhl, and Lewis E. Snyder.* **190**, 545, 35-D10
 - A Nonlinear Model for the Intensity, Line Width, and Coherence of Astrophysical Masers. *Richard A. Rosen.* **190**, L73, 33-G11
 - Astrophysical Masers. V. Pump Mechanisms for H₂O Masers. *Peter Goldreich and John Kwan.* **191**, 93, 40-A4
 - Radiative Relaxation of Hyperfine Populations. *John Kwan.* **191**, 101, 40-A12
 - Time Variations in the OH Microwave and Infrared Emission from Late-Type Stars. *Paul M. Harvey, Kenneth P. Bechis, William J. Wilson, and John A. Ball.* **191**, 599, 46-A5; Suppl. 27, 331 (No. 248)
 - Infrared Pumping Processes for SiO Masers. *T. R. Geballe and C. H. Townes.* **191**, L37, 42-C10
 - The Saturation Behavior of Nonuniformly Pumped Masers. *Douglas A. Keeley.* **192**, 601, 59-C2
 - Detection of the *J = 1 → 0* Rotational Transition of vibrationally Excited Silicon Monoxide. *P. Thaddeus, J. Mather, J. H. Davis, and G. N. Blair.* **192**, L33, 53-C3
 - Silicon Monoxide: Detection of Maser Emission from the Second vibrationally Excited State. *David Buhl, Lewis E. Snyder, Frank J. Lovas, and Donald R. Johnson.* **192**, L97, 58-A1
 - The Interpretation of the Interferometric Maps of H₂O Masers near H II Regions. *John Kwan and T. X. Thuan.* **194**, 293, 77-G2
 - A Strong Water Maser Associated with a Herbig-Haro Object. *Dale F. Dickinson, Gabriel Kojoian, and Stephen E. Strom.* **194**, L93, 80-G4
 - Radiative Trapping and Population Inversions of the SiO Maser. *John Kwan and Nick Scoville.* **194**, L97, 80-G7
- Mass Loss**
- Acceleration of QSO Clouds by Radiation Pressure. *Reuven Opher.* **187**, 5, 1-A6
 - Scorpius X-1: Origin of the Radio and Hard X-Ray Emissions. *R. Ramaty, C. C. Cheng, and S. Tsuruta.* **187**, 61, 1-E3
 - A Model Envelope for the Shell Star 1 Delphini. *J. M. Marlborough and A. P. Cowley.* **187**, 99, 2-A4
 - Transfer of Resonance-Line Radiation in Differentially Expanding Atmospheres. III. Formation of PCygni-Type Lines by a Doublet Line or Two Partially "Blended" Lines. *Thomas G. Hewitt and Peter D. Noerdlinger.* **188**, 315, 14-A8
 - The Recent Shell Event of Zeta Ophiuchi. *Nelson J. Irvine.* **188**, L19, 12-D4
 - Solid Particles and Stellar Mass Loss. *John D. Fix and David R. Alexander.* **188**, L91, 18-D3
 - Models of Asymptotic-Giant-Branch Stars. *P. R. Wood.* **190**, 609, 36-B1
 - Optical Observations of HD 77581 and a Model for the System HD 77581-2U 0900-40. *Larry D. Petro and W. A. Hiltner.* **190**, 661, 36-F7
 - Island Solutions in Linear Series of Static Stellar Models with Core Helium and Shell Hydrogen Burning for *M* = 5, 7, and 9 *M*_○. *D. Lauterborn and R. A. Siquig.* **191**, 589, 45-G11
 - Infrared Photometry of Wolf-Rayet Stars from 2.3 to 23 Microns. *J. A. Hackwell, R. D. Gehrz, and J. R. Smith.* **192**, 383, 55-D11
 - Steady-State Mass Loss for Be Stars. *D. Nelson Limber.* **192**, 429, 56-A5
- V1016 Cygni: Spectral Observations 1969-1973. *M. Pim Fitzgerald and Andrea Pilavaki.* **192**, 575, 57-D7; Suppl. **28**, 147 (No. 258)
- The X-Ray Binary HD 77581. *J. B. Hutchings.* **192**, 685, 60-A13
- Black-Hole-Neutron-Star Collisions. *James M. Lattimer and David N. Schramm.* **192**, L145, 61-G11
- Formation and Flow of Dust Grains in Cool Stellar Atmospheres. *E. E. Salpeter.* **193**, 585, 70-F11
- Masses and Luminosities of Population II Cepheids. *E. Böhm-Vitense, P. Szkody, G. Wallerstein, and Icko Iben, Jr.* **194**, 125, 75-C6
- A Search for Soft-X-Ray Emission from Red-Giant Coronae. *Bruce Margon, Keith O. Mason, and Peter W. Sanford.* **194**, L75, 80-F1
- Mass-Luminosity Relation**
- The Local Mass Density. *Glenn J. Veeder.* **191**, L57, 46-B1
 - The Mass of the Dwarf Nova EM Cygni. *Edward L. Robinson.* **193**, 191, 64-G10
 - Speckle Interferometry. III. High-Resolution Measurements of Twelve Close Binary Systems. *A. Labeyrie, D. Bonneau, R. V. Stachnik, and D. Y. Gezari.* **194**, L147, 84-F5
- Massive Stars**
- Dynamical Phases of Rotating Supermassive Stars. *Klaus J. Fricke.* **189**, 535, 26-D1
 - s-Process Nucleosynthesis in Massive Stars: Core Helium Burning. *Richard G. Couch, Ann B. Schmiedekamp, and W. David Arnett.* **190**, 95, 29-A1
 - Evidence for the Existence of a Massive Companion to X Persei (=2U 0352+30?). *J. B. Hutchings, A. P. Cowley, D. Crampton, and R. O. Redman.* **191**, L101, 49-A2
 - Influence of Rotation on the Maximum Mass of Pulsationally Stable Stars. *Richard Stothers.* **192**, 145, 51-C11
 - Influence of Opacity on the Pulsational Stability of Massive Stars with Uniform Chemical Composition. II. Modified Kramers Opacity. *V. K. Sastri and Richard Stothers.* **193**, 677, 71-F7
 - Advanced Evolution of Massive Stars. VI. Oxygen Burning. *W. David Arnett.* **194**, 373, 78-F10
 - Violation of the Vogt-Russell Theorem for Homogeneous Non-degenerate Stars. *Richard Stothers.* **194**, 699, 83-E12
- Mercury**
- A New Upper Limit for an Atmosphere of CO₂, CO on Mercury. *Uwe Fink, Harold P. Larson, and Richard F. Poppen.* **187**, 407, 5-G2
 - The Nature of the Subsurface of Mercury from Microwave Observations at Several Wavelengths. *Jeffrey N. Cuzzi.* **189**, 577, 26-G1
 - The Oblateness of the Sun. *R. H. Dicke and H. Mark Goldenberg.* **190**, 507, 33-E9; Suppl. **27**, 131 (No. 241)
 - Surface Temperature and Emissivity of Mercury. *Olav L. Hansen.* **190**, 715, 37-C3
- Metal-poor Stars: see Weak-Line Stars**
- Metallic-Line Stars**
- On the Abundance of Europium. *Mark R. Hartoog, Charles R. Cowley, and Saul J. Adelman.* **187**, 551, 8-C1
 - Metallicity in Border Regions of the Am Domain. III. Analysis of the Hot Stars Alpha Geminorum A and B and Theta Leonis. *Myron A. Smith.* **189**, 101, 20-A7
 - Further Observations of Stars in the Intermediate-Age Open Cluster NGC 2477. *F. D. A. Hartwick and James E. Hesser.* **192**, 391, 55-E7
 - Ultraviolet Spectrophotometry of Sirius from Gemini 12. *G. G. Spear, Y. Kondo, and K. G. Henize.* **192**, 615, 59-D2
 - An Empirical Line Blanketing Study of Am Stars. *A. Eric Rydgren and Myron A. Smith.* **193**, 125, 64-C1
- Meteorites and Meteors**
- A New Limit on the Interstellar Abundance of Boron. *Donald C. Morton, Andrew M. Smith, and Theodore P. Stecher.* **189**, L109, 27-C11
 - Roche Limit of a Solid Body. *H. R. Aggarwal and V. R. Oberbeck.* **191**, 577, 45-F12

Meteorites and Meteors — Continued

- A Possible Identification of the 10-Micron "Silicate" Feature.
Kenrick L. Day. **192**, L15, 53-B1
 Interstellar Molecules: Origin by Catalytic Reactions on Grain Surfaces?
Edward Anders, Ryoichi Hayatsu, and Martin H. Studier. **192**, L101, 58-A5
 Radiometric Diameters and Albedos of 40 Asteroids.
David Morrison. **194**, 203, 76-B1

Microwave Radiation: see Radio Radiation Molecules

- Stellar Molecular Abundances. II. The Violet Depression in Carbon Stars.
Lee W. Hartmann and Joseph F. Dolan. **187**, 151, 2-D11
 The Methanol Source in Orion at 1.2 Centimeters.
M. F. Chui, A. C. Cheung, D. Matsakis, C. H. Townes, and A. G. Cardamino. **187**, L19, 3-C2
 The Hyperfine A-Doubling Spectrum of Sulfur Hydride in the $^2\Pi_{3/2}$ State.
W. L. Meerts and A. Dymanus. **187**, L45, 3-D12
 The Oxygen Abundance in the Metal-deficient Star HD 122563.
D. L. Lambert, C. Sneden, and L. M. Ries. **188**, 97, 11-A9
 Is X-ogen HCO $^+$?
Eric Herbst and William Klemperer. **188**, 255, 13-D6
 VY Canis Majoris. IV. The Emission Bands of ScO.
G. H. Herbig. **188**, 533, 16-G4
 A New Analysis of the A $^2\Delta-X ^2\Pi$ System of CH.
Brian M. Krupp. **189**, 389, 24-C5
 Cyanogen-Band Strengths of Giant Stars in 47 Tucanae.
Robert D. McClure and Wayne Osborn. **189**, 405, 25-A11
 Hartree-Fock Bound States for Molecule-Ions HeC $^{2+}$ and HeC $^+$.
S. W. Harrison, G. A. Henderson, L. J. Massa, and P. Solomon. **189**, 605, 27-B2
 Detection of OH at 18-Centimeter Wavelength in Comet Kohoutek (1973f).
B. E. Turner. **189**, L137, 27-E9
 Laboratory Microwave Spectrum of Ethylene Oxide.
Chiaki Hirose. **189**, L145, 27-F1
 The Carbon Monoxide Band Strength and $^{13}\text{C}/^{12}\text{C}$ Ratio in K Giants.
Stephen T. Ridgway. **190**, 591, 35-G12
 On the C $_2$, CN, and CO Indices of Carbon Stars.
Theodore D. Faÿ, Jr. **190**, 597, 36-A4
 A Nonlinear Model for the Intensity, Line Width, and Coherence of Astrophysical Masers.
Richard A. Rosen. **190**, L73, 33-G11
 Molecular-Hydrogen Absorption Features in the Spectrum of Quasi-stellar Object 4C 05.34.
R. W. Carlson. **190**, L99, 37-E9
 Electronic Transitions of the LaO Molecule.
L. Schoonveld and S. Sundaram. **191**, 288, 41-G2; Suppl. **27**, 307 (No. 246)
 Infrared Pumping Processes for SiO Masers.
T. R. Geballe and C. H. Townes. **191**, L37, 42-C10
 Radiofrequency Emission from CH in Comet Kohoutek (1973f).
J. H. Black, E. J. Chaisson, J. A. Ball, H. Penfield, and A. E. Lilley. **191**, L45, 42-D3
 A Search for Molecular Hydrogen in Quasar Absorption Spectra.
Marc Aaronson, John Harry Black, and Christopher F. McKee. **191**, L53, 46-A10
 Formaldehyde Line Emission at 4.8 GHz near NGC 7538.
D. Downes and T. L. Wilson. **191**, L77, 46-C5
 Beam Maser Measurements of CH $_3$ O Rotational Transitions.
Linda Gaines, K. H. Casleton, and S. G. Kukolich. **191**, L99, 46-E1
 Electronic Transitions of the ZrO Molecule: Triplet Systems.
L. Schoonveld and S. Sundaram. **192**, 207, 52-A1
 H $_2$ O $^+$ in Spectra of Comet Bradfield (1974b).
P. Wehinger and S. Wyckoff. **192**, L41, 53-C10
 Silicon Monoxide: Detection of Maser Emission from the Second vibrationally Excited State.
David Buhl, Lewis E. Snyder, Frank J. Lovas, and Donald R. Johnson. **192**, L97, 58-A1
 The Visible Spectrum of Uranus.
R. E. Danielson. **192**, L107, 58-A10
 A Lower Limit on the $^{12}\text{C}/^{13}\text{C}$ Ratio in Alpha Herculis.
Rodger I. Thompson and Harold L. Johnson. **193**, 147, 64-D8

Sulfuric Acid Cloud Interpretation of the Infrared Spectrum of Venus. John V. Martonchik. **193**, 495, 69-A8

The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. II. CN and CO in Alpha Orionis.
D. L. Lambert, D. S. Dearborn, and C. Sneden. **193**, 621, 71-B4

The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. III. Alpha Tauri, Beta Geminorum, and Mu Leonis.
J. Tomkin and D. L. Lambert. **193**, 631, 71-C1

On the Interstellar Abundance of the CH $^+$ Radical.
J. Brzozowski, N. Elander, P. Erman, and M. Lyrra. **193**, 741, 72-D1

Infrared Photometry of High-Luminosity Supergiants Earlier than M and the Interstellar Extinction Law.
J. A. Hackwell and R. D. Gehrz. **194**, 49, 74-E2

Studies of Evolved Stars. IV. Band Strength Ratios as Indicators of Mixing in M, MS, and S Stars.
John M. Scalo. **194**, 361, 78-E12

Radiative and Predissociation Probabilities for Individual Rotational Levels of the B Σ^- State of CH with Application to the Radiative Recombination of CH in the Interstellar Medium.
Neil H. Brooks and Wm. Hayden Smith. **194**, 513, 80-C1

The $^{12}\text{C}/^{13}\text{C}$ Ratio in Comet Kohoutek (1973).
A. C. Danks, D. L. Lambert, and C. Arpigny. **194**, 745, 84-B1

Silicon Carbide: Its Ground State and Predicted Spectrum.
Barry L. Lutz and James A. Ryan. **194**, 753, 84-B8

A-Type Doubling in the CD Molecule.
R. E. Hammersley and W. G. Richards. **194**, L61, 76-G4

Collapsing Molecular Clouds?
Robert B. Loren, William L. Peters, and Paul A. Vanden Bout. **194**, L103, 81-A1

Molecules, Interstellar

Accurate Positions of OH Sources.
C. G. Wynn-Williams, M. W. Werner, and W. J. Wilson. **187**, 41, 1-C10

The Chemistry of Sulfur in Interstellar Clouds.
M. Oppenheimer and A. Dalgarno. **187**, 231, 4-B4

Infrared Studies of H II Regions and OH Sources.
C. G. Wynn-Williams, E. E. Becklin, and G. Neugebauer. **187**, 473, 7-D8

Microwave Spectrum of ^{13}C Methanol.
S. S. Haque, R. M. Lees, J. M. Saint Clair, Yardley Beers, and Donald R. Johnson. **187**, L15, 3-B13

Microwave Detection of Interstellar CH.
B. E. Turner and B. Zuckerman. **187**, L59, 6-B11

Molecular Clouds in the Galactic Nucleus.
N. Z. Scoville, P. M. Solomon, and K. B. Jefferts. **187**, L63, 6-C1

Radiative Transfer, Excitation, and Cooling of Molecular Emission Lines (CO and CS).
N. Z. Scoville and P. M. Solomon. **187**, L67, 6-C5

The Dipole Moment of Isocyanic Acid, HNCO, and its Astrophysical Consequences.
W. H. Hocking, M. C. L. Gerry, and G. Winnewisser. **187**, L89, 6-D13

A Search for OD in the Galactic Center.
Mark Allen, Diego A. Cesarsky, and Richard M. Crutcher. **188**, 33, 10-C5

Ion-Molecule Reactions, Molecule Formation, and Hydrogen-Isotope Exchange in Dense Interstellar Clouds.
William D. Watson. **188**, 35, 10-C7

On the Association of C $^+$ and COH $^+$ with H $_2$.
F. C. Fehsenfeld, D. B. Dunkin, and E. E. Ferguson. **188**, 43, 10-D1

The H $_2$ O Source in Sagittarius B2.
J. A. Waak and C. H. Mayer. **189**, 67, 19-F1

$^{12}\text{C}/^{13}\text{C}$ Abundance Ratios from Observations of Interstellar H $_2$ C ^{18}O .
B. Zuckerman, D. Buhl, Patrick Palmer, and L. E. Snyder. **189**, 217, 22-D7

Molecular CH, CH $^+$, and H $_2$ in the Interstellar Gas.
William D. Watson. **189**, 221, 22-D12

Detection of Radio Recombination-Line Emission from the Rho Ophiuchi Dark Cloud.
Robert L. Brown and G. R. Knapp. **189**, 253, 22-G3

Line Spectra in Interstellar Clouds. I. The Perseus 2 Cloud.
Frederic H. Chaffee, Jr. **189**, 427, 25-C5

Molecular Clouds.
Peter Goldreich and John Kwan. **189**, 441, 25-D7

- OH Observations near the Reflection Nebulae NGC 2068 and NGC 2071. *L. E. B. Johansson, B. Höglund, A. Winnberg, Nguyen-Q-Rieu, and W. M. Goss.* **189**, 455, 25-E6
- Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission. *P. M. Harvey, I. Gatley, M. W. Werner, J. H. Elias, N. J. Evans II, B. Zuckerman, G. Morris, T. Sato, and M. Litvak.* **189**, L87, 24-F13
- A New Source of Intense Molecular Emission in the Rho Ophiuchi Complex. *P. J. Encrenaz.* **189**, L135, 27-E7
- On Microwave Recombination Lines from H I Regions. *B. Zuckerman and John A. Ball.* **190**, 35, 28-C9
- Cosmic Background Radiation at 1.32 Millimeters. *D. J. Hegyi, W. A. Traub, and N. P. Carleton.* **190**, 543, 35-D8
- Observational Evidence for the Excitation of HCN and H₂O in Protostellar Molecular Clouds. *Frank O. Clark, David Buhl, and Lewis E. Snyder.* **190**, 545, 35-D10
- CO and CS in the Orion Nebula. *H. S. Liszt, R. W. Wilson, A. A. Penzias, K. B. Jefferts, P. G. Wannier, and P. M. Solomon.* **190**, 557, 35-E8
- Possible Evidence for a Large Magnetic Field in the Orion Infrared Nebula. *C. A. Beichman and E. J. Chaisson.* **190**, L21, 30-E11
- Chlorine-bearing Molecules in Interstellar Clouds. *M. Jura.* **190**, L33, 30-F12
- Isotopic Abundances and Line Formation in the Orion Nebula. *P. G. Wannier, P. J. Encrenaz, R. W. Wilson, and A. A. Penzias.* **190**, L77, 34-A1
- Upper Limits to the Flux of Cosmic Rays and X-Rays in Interstellar Clouds. *Edward J. O'Donnell and William D. Watson.* **191**, 89, 40-A1
- Millimeter-Wavelength Molecular Lines and Far-Infrared Sources. *M. Morris, Patrick Palmer, B. E. Turner, and B. Zuckerman.* **191**, 349, 43-E4
- Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters. *W. J. Wilson, P. R. Schwartz, E. E. Epstein, W. A. Johnson, R. D. Etcheverry, T. T. Mori, G. G. Berry, and H. B. Dyson.* **191**, 357, 43-E11
- Formation and Destruction Rates of Interstellar H₂. *M. Jura.* **191**, 375, 43-G1
- Rotational Excitation of HCN by Collisions. *Sheldon Green and Patrick Thaddeus.* **191**, 653, 47-D13
- Laboratory Measurements of Some Ion-Molecule Reactions Related to the Formation of HCN in Dense Interstellar Clouds. *H. I. Schiff, R. S. Hemsworth, J. D. Payzant, and D. K. Bohme.* **191**, L49, 42-D7
- Radio Detection of Interstellar Dimethyl Ether. *L. E. Snyder, D. Buhl, P. R. Schwartz, F. O. Clark, D. R. Johnson, F. J. Lovas, and P. T. Giguere.* **191**, L79, 46-C7
- Magnetic Fields in the Orion Molecular Cloud from the Zeeman Effect in SO. *F. O. Clark and D. R. Johnson.* **191**, L87, 46-D1
- On the Theory of H₂ Rotational Excitation. *Lyman Spitzer, Jr., and Ellen Gould Zweibel.* **191**, L127, 49-B10
- Detection of Interstellar Methylamine. *N. Kaifu, M. Morimoto, K. Nagane, K. Akabane, T. Iguchi, and K. Takagi.* **191**, L135, 49-C5
- Detection of Interstellar Methylamine by its 2 ω 1 10 Å α -State Transition. *N. Fourakis, K. Takagi, and M. Morimoto.* **191**, L139, 49-C8
- The Fractional Ionization in Dense Interstellar Clouds. *M. Oppenheimer and A. Dalgarno.* **192**, 29, 50-B11
- Some Properties of H₂CN⁺: A Potentially Important Interstellar Species. *Peter K. Pearson and Henry F. Schaefer III.* **192**, 33, 50-C1
- CO Emission Associated with Sharpless H II Regions. *Dale F. Dickinson, Jay A. Frogel, and S. Eric Persson.* **192**, 347, 55-B1
- Chemical Heating of Interstellar Clouds. *A. Dalgarno and M. Oppenheimer.* **192**, 597, 59-B13
- The New Molecular Cloud in Orion. *M. Morris, B. Zuckerman, B. E. Turner, and Patrick Palmer.* **192**, L27, 53-B11
- Detection of the J = 1 → 0 Rotational Transition of vibrationally excited Silicon Monoxide. *P. Thaddeus, J. Mather, J. H. Davis, and G. N. Blair.* **192**, L33, 53-C3
- Hydrogen Chloride in Dense Interstellar Clouds. *A. Dalgarno, T. de Jong, M. Oppenheimer, and J. H. Black.* **192**, L37, 53-C7
- Interstellar Molecules: Origin by Catalytic Reactions on Grain Surfaces? *Edward Anders, Ryoichi Hayatsu, and Martin H. Studier.* **192**, L101, 58-A5
- Models of Massive Molecular Clouds. *B. Zuckerman and N. J. Evans II.* **192**, L149, 62-A1
- Detection of the 10.464-GHz Transition of Interstellar Thioformaldehyde. *L. H. Doherty, J. M. MacLeod, and T. Oka.* **192**, L157, 62-A9
- Model Calculations for Diffuse Molecular Clouds. *A. E. Glassgold and William D. Langer.* **193**, 73, 63-F5
- Column Densities of Interstellar Molecular Hydrogen. *Lyman Spitzer, Jr., William D. Cochran, and Alan Hirshfield.* **193**, 759, 72-E4; Suppl. **28**, 373 (No. 266)
- Kinematics of the Orion A Molecular Cloud. *R. A. Linke and P. G. Wannier.* **193**, L41, 66-C11
- U93.174: A New Interstellar Line with Quadrupole Hyperfine Splitting. *B. E. Turner.* **193**, L83, 69-E1
- Tentative Identification of U93.174 as the Molecular Ion N₂H⁺. *S. Green, J. A. Montgomery, Jr., and P. Thaddeus.* **193**, L89, 69-E6
- Why ¹³C¹⁸O Profiles in Dark Clouds Do Not Have Flat Tops. *Andrew S. Milman.* **193**, L93, 69-E9
- The Ethynyl Radical C₂H: A New Interstellar Molecule. *K. D. Tucker, M. L. Kutner, and P. Thaddeus.* **193**, L115, 72-F9
- A Search for Interstellar Nitroxyl (HNO). *N. Fourakis, M. W. Sinclair, R. D. Brown, J. G. Crofts, and P. D. Godfrey.* **194**, 41, 74-D8
- Observations of H₂CO in the Direction of Cassiopeia A. *T. H. Troland and Carl Heiles.* **194**, 43, 74-D10
- Fine Structure in H II Regions. II. *B. E. Turner, Bruce Balick, D. D. Cudaback, Carl Heiles, and Robert J. Boyle.* **194**, 279, 77-F1
- Radiative and Predissociation Probabilities for Individual Rotational Levels of the B ³S State of CH with Application to the Radiative Recombination of CH in the Interstellar Medium. *Neil H. Brooks, and Wm. Hayden Smith.* **194**, 513, 80-C1
- On the Relationship of OH and Formaldehyde with Interstellar Extinction. *B. E. Turner and C. E. Heiles.* **194**, 525, 80-C11
- Molecular Studies of Two Dark Nebulae Associated with Herbig-Haro Objects. *C. J. Lada, C. A. Gottlieb, M. M. Litvak, and A. E. Lilley.* **194**, 609, 82-F6
- Nebulae**
- Carbon Recombination Lines and Interstellar Hydrogen Clouds. *A. K. Dupree.* **187**, 25, 1-B9
- Accurate Positions of OH Sources. *C. G. Wynn-Williams, M. W. Werner, and W. J. Wilson.* **187**, 41, 1-C10
- An Infrared Source Associated with a Herbig-Haro Object. *K. M. Strom, S. E. Strom, and G. L. Grasdalen.* **187**, 83, 1-F12
- The Chemistry of Sulfur in Interstellar Clouds. *M. Oppenheimer and A. Dalgarno.* **187**, 231, 4-B4
- Infrared Studies of H II Regions and OH Sources. *C. G. Wynn-Williams, E. E. Becklin, and G. Neugebauer.* **187**, 473, 7-D8
- The Motions in the Central Region of NGC 4736: Evidence for an Expanding Ring. *P. C. van der Kruit.* **188**, 3, 10-A6
- Ion-Molecule Reactions, Molecule Formation, and Hydrogen-Isotope Exchange in Dense Interstellar Clouds. *William D. Watson.* **188**, 35, 10-C7
- Optical Thickness in the He I Singlet Spectrum of Nebulae. *R. R. Robbins and A. P. Bernat.* **188**, 309, 14-A2
- Helium Abundance at the Galactic Center. *M. Jura and E. L. Wright.* **188**, 473, 16-C2
- Spectrophotometric Observations of the Compact H II Region K3-50 and of NGC 6857. *S. Eric Persson and Jay A. Frogel.* **188**, 523, 16-F9

Nebulae — Continued

- Nebular Photometry with an Echelle Spectrometer: [O III] Line Ratios in NGC 1976 and NGC 6853. *T. J. Bohuski, R. J. Dufour, and D. E. Osterbrock.* **188**, 529, 16-F14
- Studies of Neutral-Hydrogen Cloud Structure. *G. L. Verschuur.* **188**, 669, 18-B13; Suppl. **27**, 65 (No. 238)
- Detection of the [Fe XIV] Coronal Line at 5303 Å in the Cygnus Loop. *B. E. Woodgate, H. S. Stockman, Jr., J. R. P. Angel, and R. P. Kirshner.* **188**, L79, 18-C6
- Radiative Acceleration of Gas Clouds near Quasi-stellar Objects and Seyfert Galaxy Nuclei. *William G. Mathews.* **189**, 23, 19-B12
- On the Recombination-Line Observations toward Supernova 3C 391. *E. J. Chaisson.* **189**, 69, 19-F3
- Structure of the OH/Infrared Object NML Cygnus. II. Analysis of the OH Interferometry. *G. H. Herbig.* **189**, 75, 19-F9
- The Coalsack. II. Photometry of Suspected Flare Stars. *Wm. Bruce Weaver.* **189**, 81, 19-G1
- QSO Envelopes: Optically Thin, Low Density, and Normal Abundances? *Jeffrey D. Scargle, Lawrence J. Caroff, and C. Bruce Tarter.* **189**, 181, 22-B2
- ¹²C/¹³C Abundance Ratios from Observations of Interstellar H₂¹³C¹⁶O. *B. Zuckerman, D. Buhl, Patrick Palmer, and L. E. Snyder.* **189**, 217, 22-D7
- Photoelectric Spectrophotometry of the Cygnus Loop. *Joseph S. Miller.* **189**, 239, 22-F1
- Detection of Radio Recombination-Line Emission from the Rho Ophiuchi Dark Cloud. *Robert L. Brown and G. R. Knapp.* **189**, 253, 22-G3
- On the Velocity Structure of the Interstellar Clouds near Rho Ophiuchi. *Judith G. Cohen and George Wallerstein.* **189**, 259, 22-G9
- The Coalsack. III. A Search for T Tauri Stars. *Wm. Bruce Weaver.* **189**, 263, 22-G12
- Molecular Clouds. *Peter Goldreich and John Kwan.* **189**, 441, 25-D7
- OH Observations near the Reflection Nebulae NGC 2068 and NGC 2071. *L. E. B. Johansson, B. Höglund, A. Winnberg, Nguyen-Q-Rieu, and W. M. Goss.* **189**, 455, 25-E6
- On the Use of Mean Escape Probabilities to Solve Transfer Problems in Nebulae. *A. P. Bernat and R. R. Robbins.* **189**, 459, 25-E11
- Dust Grains in a Hot Gas. II. Astrophysical Applications. *Joseph Silk and John Robert Burke.* **190**, 11, 28-A14
- On Microwave Recombination Lines from H I Regions. *B. Zuckerman and John A. Ball.* **190**, 35, 28-C9
- Monte Carlo Model of Reflection Nebulae: Intensity Gradients. *T. Roark, B. Roark, and G. W. Collins II.* **190**, 67, 28-F1
- A Second Survey of H II Regions in Galaxies. *Paul W. Hodge.* **190**, 241, 30-C14; Suppl. **27**, 113 (No. 239)
- Steps toward the Hubble Constant. I. Calibration of the Linear Sizes of Extragalactic H II Regions. *Allan Sandage and G. A. Tammann.* **190**, 525, 35-B4
- Observational Evidence for the Excitation of HCN and H₂O in Protostellar Molecular Clouds. *Frank O. Clark, David Buhl, and Lewis E. Snyder.* **190**, 545, 35-D10
- 34-Micron Observations of Eta Carinae, G333.6–0.2, and the Galactic Center. *E. Sutton, E. E. Becklin, and G. Neugebauer.* **190**, L69, 33-G7
- Infrared and Optical Observations of Herbig-Haro Objects. *S. E. Strom, G. L. Grasdalen, and K. M. Strom.* **191**, 111, 40-B6
- Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters. *W. J. Wilson, P. R. Schwartz, E. E. Epstein, W. A. Johnson, R. D. Etcheverry, T. T. Mori, G. G. Berry, and H. B. Dyson.* **191**, 357, 43-E11
- Ionization of the Low-Density Interstellar Medium. *S. Torres-Peimbert, A. Lazcano-Araujo, and M. Peimbert.* **191**, 401, 44-A12
- High-Frequency Observations of Possible "Heavy-Element" Recombination Lines. *E. J. Chaisson.* **191**, 411, 44-B8
- The T Tauri Emission Nebula. *Richard D. Schwartz.* **191**, 419, 44-C3
- Optical Polarization of Selected Herbig-Haro Objects. *K. M. Strom, S. E. Strom, and T. D. Kinman.* **191**, L93, 46-D6
- Maps of Spatial and Kinematic Structure of Galactic Nebulae. I. H 76α Studies of M17, M42, W51, and DR 21. *T. R. Gull and B. Balick.* **192**, 63, 50-E1
- Infrared Emission from H II Regions. *Nino Panagia.* **192**, 221, 52-B1
- The Nuclei of Peculiar Emission-Line Galaxies. *Patrick S. Osmer, Malcolm G. Smith, and Daniel W. Weedman.* **192**, 279, 54-C12
- Radio Recombination Lines at a Wavelength of 78 Centimeters. *Kurtiss J. Gordon, Courtney P. Gordon, and Felix J. Lockman.* **192**, 337, 55-A4
- Compact Radio Structure in the H II Region G351.6-1.3. *J. J. Broderick and Robert L. Brown.* **192**, 343, 55-A10
- CO Emission Associated with Sharpless H II Regions. *Dale F. Dickinson, Jay A. Frogel, and S. Eric Persson.* **192**, 347, 55-B1
- Compact Infrared Sources Associated with Southern H II Regions. *Jay A. Frogel and S. Eric Persson.* **192**, 351, 55-B4
- The Structure of an H I–H II Boundary. *A. K. Macpherson.* **192**, 369, 55-C11
- Optical Interstellar Lines in Dark Clouds. II. K I and Ultraviolet Sodium Lines. *Judith G. Cohen.* **192**, 379, 55-D7
- Far-Infrared Emission from H II Regions. II. Multicolor Photometry of Selected Sources and 2.2 Resolution Maps of M42 and NGC 2024. *D. A. Harper.* **192**, 557, 57-C4
- Chemical Heating of Interstellar Clouds. *A. Dalgarno and M. Oppenheimer.* **192**, 597, 59-B13
- Dark Nebulae in the Magellanic Clouds. *Sidney van den Bergh.* **193**, 63, 63-E9
- Helium in Southern H II Regions. I. *J. Danziger.* **193**, 69, 63-F2
- Chemical Composition of H II Regions in the Large Magellanic Cloud and its Cosmological Implications. *Manuel Peimbert and Silvia Torres-Peimbert.* **193**, 327, 67-C8
- Composition Gradients Across Spiral Galaxies. *G. A. Shields.* **193**, 335, 67-D2
- Infrared Observations of H II Regions in External Galaxies. *S. E. Strom, K. M. Strom, G. L. Grasdalen, and R. W. Capps.* **193**, L7, 66-A8
- Observations of H₂CO in the Direction of Cassiopeia A. *T. H. Troland and Carl Heiles.* **194**, 43, 74-D10
- Fine Structure in H II Regions. II. *B. E. Turner, Bruce Balick, D. D. Cudaback, Carl Heiles, and Robert J. Boyle.* **194**, 279, 77-F1
- The Interpretation of the Interferometric Maps of H₂O Masers near H II Regions. *John Kwan and T. X. Thuan.* **194**, 293, 77-G2
- An Atlas of Dust and H II Regions in Galaxies. *Beverly T. Lynds.* **194**, 213, 76-B11; Suppl. **28**, 391 (No. 267)
- X-Ray Structure of the Cygnus Loop. *S. Rappaport, R. Doxsey, A. Solinger, and R. Borken.* **194**, 329, 78-C3
- The Gamma Cygni Supernova Remnant and Nebula. *Hugh M. Johnson.* **194**, 337, 78-C11
- The Scattering by Dust in the Orion Nebula. *F. H. Schiffer III and John S. Mathis.* **194**, 597, 82-E8
- Molecular Studies of Two Dark Nebulae Associated with Herbig-Haro Objects. *C. J. Lada, C. A. Gottlieb, M. M. Litvak, and A. E. Lilley.* **194**, 609, 82-F6
- Radio Observations of the Infrared Source AFCRL 809-2992. *Robert L. Brown.* **194**, L9, 76-C11
- Nebulae, Individual (arranged by Messier number, NGC number, and other designation)
- By Messier Number
- Discovery and CO Observations of a New Molecular Source near M17. *Charles Lada, Dale F. Dickinson, and Hays Penfield.* **189**, L35, 21-B4
- By NGC Number
- An Infrared Study of NGC 2024. *G. L. Grasdalen.* **193**, 373, 67-F12
- Spectrophotometric Observations of NGC 6543. *G. O.*

- Boeshaar, S. J. Czyzak, and L. H. Aller.** 193, 290, 65-G6; Suppl. 28, 335 (No. 264)
- Spectrophotometric Observations of the Compact H II Region K3-50 and of NGC 6857.** *S. Eric Persson and Jay A. Frogel.* 188, 523, 16-F9
- By Other Designation**
- Infrared Observations of the Radio Source G30.8-0.0 in the W43 Complex.** *Judith L. Pipher, G. L. Grasdalen, and Baruch T. Soifer.* 193, 283, 65-F13
- Scattering in the Shell of Eta Carinae.** *Eric R. Craine.* 191, 105, 40-B1
- Infrared Emission from the Southern H II Region H2-3.** *E. E. Becklin, J. A. Frogel, D. E. Kleinmann, G. Neugebauer, S. E. Persson, and C. G. Wynn-Williams.* 187, 487, 7-E6
- The Structure of the Orion Nebula. I. Observations of the C 85 α Recombination Line.** *B. Balick, R. H. Gammon, and L. H. Doherty.* 188, 45, 10-D3
- The Nature and Distribution of Carbon Recombination-Line Emission in the Rho Ophiuchi Dark Cloud.** *Robert L. Brown, R. H. Gammon, G. R. Knapp, and Bruce Balick.* 192, 607, 59-C8
- Radio Fine Structure in the Galactic Center.** *Bruce Balick and Robert H. Sanders.* 192, 325, 54-G4
- Negative Ions**
- Absorption of Infrared Radiation by Electrons in the Field of a Neutral Hydrogen Atom. *James R. Stallcop.* 187, 179, 2-F7
- Radiative Transitions Involving the (2p²) ³P₀ Metastable Autodetaching State of H. *V. L. Jacobs, A. K. Bhatia, and A. Temkin.* 191, 785, 48-G1
- Neptune**
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIII. The Albedos of Jupiter, Uranus, and Neptune. *Blair D. Savage and John J. Caldwell.* 187, 197, 2-G8
- On the Identification of the 6420 Å Absorption Feature in the Spectra of Uranus and Neptune. *Tobias Owen, Barry L. Lutz, Carolyn C. Porco, and Jerry H. Woodman.* 189, 379, 24-B10
- On the Upper Atmosphere of Neptune. *J. Veverka, L. Wasserman, and Carl Sagan.* 189, 569, 26-F7
- Evidence for an Internal Heat Source in Neptune. *Robert E. Murphy and Laurence M. Trafton.* 193, 253, 65-D12
- The Source of Neptune's Internal Heat and the Value of Neptune's Tidal Dissipation Factor. *L. Trafton.* 193, 477, 68-G5
- Infrared Measurements of Uranus and Neptune. *G. H. Rieke and F. J. Low.* 193, L147, 73-B1
- Neutrinos**
- Solar Models with Low Neutrino Fluxes. *Roger K. Ulrich.* 188, 369, 14-E4
- Solar Neutrinos and the Behavior of the Fermi Coupling Constant. *Arrigo Finzi.* 189, 157, 20-E5
- Finite Nuclear Size Effects on Neutrino-Pair Bremsstrahlung in Neutron Stars. *Elliott Flowers.* 190, 381, 32-D2
- Are Stellar Surface Heavy-Element Abundances Systematically Enhanced? *Paul C. Joss.* 191, 771, 48-F1
- Solar Neutrinos and the Influence of Radiative Opacities on Solar Models. *T. R. Carson, D. Ezer, and R. Stothers.* 194, 743, 84-A12
- Neutron Stars**
- Compounds in Neutron-Star Crusts. *T. A. Witten, Jr.* 188, 615, 17-F5
- Upper Limit on 2.5-Second Pulsations from Hercules X-1. Y. Avni, J. N. Bahcall, P. C. Joss, E. Schreier, H. Tananbaum, and D. Q. Lamb. 188, L35, 15-D6
- Accretion Flows in Galactic X-Ray Sources. I. Optically Thin Spherically Symmetric Model. *James Buff and Richard McCray.* 189, 147, 20-D10
- Post-Newtonian Neutron Stars. *Robert V. Wagoner and Robert C. Malone.* 189, L75, 24-F2
- Rotating Superfluid in Neutron Stars. *M. A. Ruderman and P. G. Sutherland.* 190, 137, 29-C14
- Photon Opacity in Surfaces of Magnetic Neutron Stars. *J. Lodenquai, V. Canuto, M. Ruderman, and S. Tsuruta.* 190, 141, 29-D3
- Finite Nuclear Size Effects on Neutrino-Pair Bremsstrahlung in Neutron Stars. *Elliott Flowers.* 190, 381, 32-D2
- Correlation Effects on the Energy Shifts of Excited Nucleons in Neutron-Star Matter. *A. Nandy.* 190, 385, 32-D5
- On the Electrodynamic Equilibrium of a Space Charge Region around a Rotating Neutron Star with an Aligned Magnetic Field. *Werner G. Pilipp.* 190, 391, 32D11
- An Exact Study of Rigidly and Rapidly Rotating Stars in General Relativity with Application to the Crab Pulsar. *Silvano Bonazzola and Jean Schneider.* 191, 273, 41-F2
- Structure of Solid Iron in Superstrong Neutron-Star Magnetic Fields. *Hsing-Hen Chen, Malvin A. Ruderman, and Peter G. Sutherland.* 191, 473, 44-F13
- A Model for the Transient X-Ray Sources. *H. M. Van Horn and C. J. Hansen.* 191, 479, 44-G4
- A Spectroscopic Analysis of HZ Herculis. *David Crampton and J. B. Hutchings.* 191, 483, 44-G7
- Analytic Pulsar Models. *Richard C. Adams, Jeffrey M. Cohen, Ronald J. Adler, and Charles Sheffield.* 192, 525, 57-A1
- On the Axisymmetric Pulsar Atmosphere. *Satoshi Hinata and E. Atlee Jackson.* 192, 703, 60-C1
- Neutron Stars in Close Binary Systems. *J. Craig Wheeler, C. F. McKee, and M. Lecar.* 192, L71, 57-F4
- Can a Neutron Star Be Compressed into a Black Hole? *A. E. Hwang and John J. Dykla.* 192, L141, 61-G8
- Black-Hole-Neutron-Star Collisions. *James M. Lattimer and David N. Schramm.* 192, L145, 61-G11
- Time-dependent Accretion Disks around Compact Objects. II. Numerical Models and Instability of Inner Region. *Alan P. Lightman.* 194, 429, 79-C8
- High-Dispersion Spectroscopic Observations of HD 77581, a Candidate for Vela XR-1(2U 0900-40). *George Wallerstein.* 194, 451, 79-D14
- Limitations on the Masses and Other Dimensions of the Binary HD 77581. *David R. Mikkelsen and George Wallerstein.* 194, 459, 79-E9
- Novae**
- Gamma-Ray Lines from Novae. *Donald D. Clayton and Fred Hoyle.* 187, L101, 9-D9
- The Peculiar Star He 2-177: A Slow Nova and a Possible X-Ray Source. *Eric D. Carlson and Karl G. Henize.* 188, L47, 15-E2
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. X. Nova FH Serpentis 1970. *John S. Gallagher III and Arthur D. Code.* 189, 303, 23-D1
- Ultraviolet Detection of the Nova Variables V603 Aquilae and RR Pictoris. *J. S. Gallagher and A. V. Holm.* 189, L123, 27-D10
- Nova Delphini 1967. I. Spectroscopic Observations. *A. Sanyal.* 192, 574, 57-D6; Suppl. 28, 115 (No. 257)
- CNO Abundances and Hydrodynamic Models of the Nova Outburst. III. 0.5 M \odot Models with Enhanced Carbon, Oxygen, and Nitrogen. *Summer Starrfield, Warren M. Sparks, and James W. Truran.* 192, 647, 59-F5
- CNO Abundances and Hydrodynamic Models of the Nova Outburst. II. 1.00 M \odot Models with Enhanced Carbon and Oxygen. *Summer Starrfield, Warren M. Sparks, and J. W. Truran.* 192, 817, 61-C13; Suppl. 28, 247 (No. 261)
- Optical Studies of Uhuru Sources. X. The Photometric History of He 2-177 (= 3U 1639-62?). *W. Liller.* 192, L89, 57-G6
- DQ Herculis: Weak Sister to HZ Herculis. *D. Q. Lamb.* 192, L129, 61-F11
- The 71-Second Variation of DQ Herculis. *William Herbst, James E. Hesser, and Jeremiah P. Ostriker.* 193, 679, 71-F9
- Nuclear Reactions**
- Destruction of ¹⁴N by ¹⁴N(e⁻, ν)¹⁴C(α , γ)¹⁸O in Degenerate Matter. *R. Mitalas.* 187, 155, 2-D14
- Low-Temperature Photoneutron Sources for Stellar Nucleosynthesis. *Thomas G. Harrison and Terry W. Edwards.* 187, 303, 4-G2

Nuclear Reactions — Continued

- A Photoneutron Mechanism for the Production of Technetium-99 in the Interior of Evolved Stars. *Terry W. Edwards and Thomas G. Harrison.* **187**, 313, 4-G11
- The Formation of Deuterium and the Light Elements by Spallation in Supernova Shocks. *Stirling A. Colgate.* **187**, 321, 5-A4
- Carbon and Eruptive Stars: Surface Enrichment of Lithium, Carbon, Nitrogen, and ^{13}C by Deep Mixing. *I. Julianne Sackmann, Richard L. Smith, and Keith H. Despain.* **187**, 555, 8-C5
- Measurement and Theoretical Analysis of Some Reaction Rates of Interest in Silicon Burning. *A. J. Howard, H. B. Jensen, M. Rios, William A. Fowler, and Barbara A. Zimmerman.* **188**, 131, 11-C13
- Line ^{57}Co Gamma Rays: New Diagnostic of Supernova Structure. *Donald D. Clayton.* **188**, 155, 11-E6
- Solar Models with Low Neutrino Fluxes. *Roger K. Ulrich.* **188**, 369, 14-E4
- Finite Nuclear Size Effects on Neutrino-Pair Bremsstrahlung in Neutron Stars. *Elliot Flowers.* **190**, 381, 32-D2
- Reaction Rates of Interest in Late Stages of Stellar Nucleosynthesis. *A. E. Vlieks, J. F. Morgan, and S. L. Blatt.* **191**, 699, 48-A1
- 478-keV and 431-keV Line Emissions from Alpha-Alpha Reactions. *B. Kozlovsky and R. Ramaty.* **191**, L43, 42-D1
- Light-Decay Curve of the Supernova in IC 4182. *James R. Van Hise.* **192**, 657, 59-G1
- Stellar Reaction Rates for Proton Capture on ^{28}Si , ^{50}Cr , ^{54}Fe , ^{58}Ni , ^{60}Ni , and ^{61}Ni . *N. A. Roughton, M. J. Fritts, R. J. Peterson, C. S. Zaidins, and C. J. Hansen.* **193**, 187, 64-G7
- s*-Process Studies: Exact Evaluation of an Exponential Distribution of Exposures. *Donald D. Clayton and Richard A. Ward.* **193**, 397, 68-A5
- Deuterium, Tritium, and Helium-3 Production in Solar Flares. *R. Ramaty and B. Kozlovsky.* **193**, 729, 72-C1
- The Urca Process in Dense Stellar Interiors. *Richard G. Couch and Gregory L. Loumos.* **194**, 385, 78-G9
- Nucleosynthesis**
- Thick-Target Measurement of the (p, γ) Stellar Reaction Rates of the Nuclides ^{12}C , ^{28}Si , ^{46}Ti , ^{47}Ti , and ^{56}Fe . *N. A. Roughton, M. J. Fritts, R. J. Peterson, C. S. Zaidins, and C. J. Hansen.* **188**, 595, 17-D10
- Solar Neutrinos and the Behavior of the Fermi Coupling Constant. *Arrigo Finzi.* **189**, 157, 20-E5
- Sensitivity of the Star Formation Rate to the Interstellar Gas Abundance of Heavy Elements. *Raymond J. Talbot, Jr.* **189**, 209, 22-C14
- Do Helium-Shell Flashes Cause Extensive Mixing in Low-Mass Stars? *Allen V. Sweigart.* **189**, 289, 23-C2
- Carbon and Nitrogen Abundances in Metal-poor Stars. *Christopher Sneden.* **189**, 493, 26-A4
- FG Sagittae: The *s*-Process Episode. *G. E. Langer, Robert P. Kraft, and Kurt S. Anderson.* **189**, 509, 26-B5
- An Interpretation of the Puzzling Observations of FG Sagittae. *I. Julianne Christy-Sackmann and Keith H. Despain.* **189**, 523, 26-C4
- Nucleosynthesis of Lithium in Low-Energy Flares. *Ramon Canal.* **189**, 531, 26-C12
- s*-Process Nucleosynthesis in Massive Stars: Core Helium Burning. *Richard G. Couch, Ann B. Schmiedekamp, and W. David Arnett.* **190**, 95, 29-A1
- Are the UV Stars Nuclear-Powered? *J. G. Hills.* **190**, 109, 29-A14
- Resolution of the Praseodymium Abundance Anomaly in the Ba II Stars. *Marc S. Allen and Charles R. Cowley.* **190**, 601, 36-A7
- Some Recent Results from Galactic and Stellar Evolution Theory. *Raymond J. Talbot, Jr., and W. David Arnett.* **190**, 605, 36-A11
- Can Supernovae Produce Deuterium? *Richard I. Epstein, W. David Arnett, and David N. Schramm.* **190**, L13, 30-E3
- Reaction Rates of Interest in Late Stages of Stellar Nucleosynthesis. *A. E. Vlieks, J. G. Morgan, and S. L. Blatt.* **191**, 699, 48-A1
- Nucleosynthesis in White-Dwarf Atmospheres. *Fred Hoyle and Donald D. Clayton.* **191**, 705, 48-A8
- A Study of Nucleosynthesis during Explosive Carbon Burning. *R. C. Pardo, R. G. Couch, and W. D. Arnett.* **191**, 711, 48-B1
- Iron Production by ^{12}C Detonation Supernovae. *W. David Arnett.* **191**, 727, 48-C2
- Galactic Evolution and the Formation of the Light Elements. *Jean Audouze and Beatrice M. Tinsley.* **192**, 487, 56-E5
- s*-Process Studies: Exact Solution to a Chain Having Two Distinct Cross-Section Values. *Donald D. Clayton and Michael J. Newman.* **192**, 501, 56-F5
- Studies of Evolved Stars. III. Models of FG Sagittae Consistent with *s*-Process Nucleosynthesis. *Roger K. Ulrich.* **192**, 507, 56-F10
- Constraints on Models for Chemical Evolution in the Solar Neighborhood. *Beatrice M. Tinsley.* **192**, 629, 59-E1
- The Negative Correlation between the Carbon-to-Iron Ratio and the Iron Abundance. *Raymond J. Talbot, Jr.* **192**, 643, 59-F1
- CNO Abundances and Hydrodynamic Models of the Nova Outburst. III. $0.5 M_{\odot}$ Models with Enhanced Carbon, Oxygen, and Nitrogen. *Summer Starrfield, Warren M. Sparks, and James W. Truran.* **192**, 647, 59-F5
- CNO Abundances and Hydrodynamic Models of the Nova Outburst. II. $1.00 M_{\odot}$ Models with Enhanced Carbon and Oxygen. *Summer Starrfield, Warren M. Sparks, and J. W. Truran.* **192**, 817, 61-C13; Suppl. **28**, 247 (No. 261)
- Further Observations at the Interstellar Deuterium Frequency. *Jay M. Pasachoff and Diego A. Cesarsky.* **193**, 65, 63-E13
- On the Origin and Evolution of *s*-Process Elements. *David N. Schramm and Beatrice M. Tinsley.* **193**, 151, 64-D12
- On the *e*-Process: Its Components and their Neutron Excesses. *Kem L. Hainebach, Donald D. Clayton, W. David Arnett, and S. E. Woosley.* **193**, 157, 64-E3
- Advanced Evolution of Massive Stars. V. Neon Burning. *W. David Arnett.* **193**, 169, 64-F2
- s*-Process Studies: Exact Evaluation of an Exponential Distribution of Exposures. *Donald D. Clayton and Richard A. Ward.* **193**, 397, 68-A5
- Advanced Evolution of Massive Stars. VI. Oxygen Burning. *W. David Arnett.* **194**, 373, 78-F10
- On the Thermal Properties of the Convective Urca Process. *Richard G. Couch and W. David Arnett.* **194**, 537, 80-D8
- Experimental Evidence for CNO Tri-cycling. *C. Rolfs and W. S. Rodney.* **194**, L63, 80-E2
- CNO Tri-cycling as an ^{17}O Enrichment Mechanism. *David Dearborn and David N. Schramm.* **194**, L67, 80-E6
- Of-Type Stars**
- Spectroscopic Observations of HD 153919 (2U 1700-37). *Sidney C. Wolff and Nancy D. Morrison.* **187**, 69, 1-E11
- 2U 1700-37: Another Black Hole? *M. S. Bessell, B. A. Peterson, D. T. Wickramasinghe, and N. V. Vidal.* **187**, 355, 5-C10
- Spectroscopic Studies of O-Type Stars. IV. Lines in the Red Region. *Peter S. Conti.* **187**, 539, 8-B4
- The Effect of Sphericity on Stellar Continuous Energy Distributions. *John I. Castor.* **189**, 273, 23-B1
- Analysis of the Blue Spectrum of the X-Ray Binary HD 153919. *J. B. Hutchings.* **192**, 677, 60-A6
- Spectroscopic Observations of O-Type Stars. V. The Hydrogen Lines and $\lambda 4686 \text{ He II}$. *Peter S. Conti and Eva M. Leep.* **193**, 113, 64-B2
- Opacities**
- Interstellar Absorption of X-Rays. *E. L. Fireman.* **187**, 57, 1-D13
- A Comparison of the Straight-Mean, Harmonic-Mean, and Multiple-Pickett Approximations for the Line Opacities in Cool Model Atmospheres. *Duane F. Carbon.* **187**, 135, 2-C9
- Stellar Molecular Abundances. II. The Violet Depression in

- Carbon Stars.** *Lee W. Hartmann and Joseph F. Dolan.* **187**, 151, 2-D11
- Absorption of Infrared Radiation by Electrons in the Field of a Neutral Hydrogen Atom.** *James R. Stallcop.* **187**, 179, 2-F7
- Theoretical Analysis of the Al I Absorption Spectrum.** *C. D. Lin.* **187**, 385, 5-E10
- On the Opacity of the Interstellar Medium to Ultrasoft X-Rays and Extreme-Ultraviolet Radiation.** *Raymond Crudace, Francesco Paresce, Stuart Bowyer, and Michael Lampton.* **187**, 497, 7-F1
- Two New Physical Processes in the Far-Ultraviolet Spectrum of Zeta Tauri.** *Sara R. Heap and Theodore P. Stecher.* **187**, L27, 3-C10
- Free-free and Free-bound Emission in Low-Surface-Gravity Stars.** *Robert C. Gilman.* **188**, 87, 10-G13
- A Line-blanketed Model Stellar Atmosphere of Sirius.** *John W. Fowler.* **188**, 295, 13-G3
- Electron-Hydrogen Photoattachment as a Source of Ultraviolet Absorption.** *G. W. F. Drake.* **189**, 161, 20-E9
- Photon Opacity in Surfaces of Magnetic Neutron Stars.** *J. Lodengui, V. Canuto, M. Ruderman, and S. Tsuruta.* **190**, 141, 29-D3
- X-Ray Ionization Cross-Sections, and Ionization Equilibrium Equations Modified by Auger Transitions.** *Jon C. Weisheit.* **190**, 735, 37-D7
- A Quantitative Study of Silicate Extinction.** *K. L. Day, T. R. Steyer, and D. R. Huffman.* **191**, 415, 44-B13
- Radiative Transitions Involving the $(2p^2)$ 3P_0 Metastable Autodetaching State of H.** *V. L. Jacobs, A. K. Bhatia, and A. Temkin.* **191**, 785, 48-G1
- An Empirical Line Blanketing Study of Am Stars.** *A. Eric Rydgren and Myron A. Smith.* **193**, 125, 64-C1
- Influence of Opacity on the Pulsational Stability of Massive Stars with Uniform Chemical Composition. II. Modified Kramers Opacity.** *V. K. Sastri and Richard Stothers.* **193**, 677, 71-F7
- Planck Mean Cross-Sections for Four Grain Materials.** *Robert C. Gilman.* **194**, 213, 76-B11; Suppl. **28**, 397 (No. 268)
- A Comparison of Homogeneous Stellar Models Based on the Cox-Stewart and Carson Opacities.** *Richard Stothers.* **194**, 695, 83-E9
- Violation of the Vogt-Russell Theorem for Homogeneous Non-degenerate Stars.** *Richard Stothers.* **194**, 699, 83-E12
- Non-LTE H α as the Source of Missing Opacity in the Solar Atmosphere.** *K. S. Krishna Swamy and Theodore P. Stecher.* **194**, L153, 84-F12
- Open Clusters**
- Spectroscopic Comparison of Open Clusters. I. The Reddening, Blanketing, and Metallicity of M67.** *Don C. Barry and Richard H. Cromwell.* **187**, 107, 2-A11
 - Interstellar Polarization from a Medium with Changing Grain Alignment.** *P. G. Martin.* **187**, 461, 7-C10
 - NGC 2287 and the Pleiades Group.** *O. J. Eggen.* **188**, 59, 10-E3
 - The Energy Distribution of the Very Red Star in NGC 6231.** *R. Schild, J. B. Oke, and L. Searle.* **188**, 71, 10-F4
 - The Galactic Orbit of the Old Open Cluster NGC 2420.** *D. W. Keenan and K. A. Innanen.* **189**, 205, 22-C11
 - The Old Open Cluster NGC 2420.** *Robert D. McClure, William T. Forrester, and James Gibson.* **189**, 409, 25-A14
 - Intermediate-Band Photometry of M67.** *K. A. Janes.* **189**, 423, 25-C1
 - Core-Helium-Burning Stars in Young Clusters in the Large Magellanic Cloud.** *J. W. Robertson.* **191**, 67, 39-F6
 - Further Observations of Stars in the Intermediate-Age Open Cluster NGC 2477.** *F. D. A. Hartwick and James E. Hesser.* **192**, 391, 55-E7
 - Ultraviolet Television Data from the Orbiting Astronomical Observatory. II. Stellar Ultraviolet Colors and Interstellar Extinction.** *Eric Peyremann and Robert J. Davis.* **192**, 815, 61-C12; Suppl. **28**, 211 (No. 260)
 - Stellar Energy Distribution in an Infrared Cluster in Ara.** *G. W. Lockwood.* **193**, 103, 64-A7
- Convective Overshoot Mixing in Old Open Clusters.** *M. J. Prather and P. Demargue.* **193**, 109, 64-A12
- The Distance to the Hyades Cluster from R-I Photometry.** *A. R. Upgren.* **193**, 359, 67-E9
- The Open Cluster NGC 7419 and its M7 Supergiant IRC +60 375.** *William M. Fawley and Martin Cohen.* **193**, 367, 67-F3
- On a Possible Carbon-Star Member of the Old Open Cluster Trumpler 5.** *J. Keith Kalinowski, Martin S. Burkhead, and R. Kent Honeycutt.* **193**, L77, 69-D8
- Possible Abundance Differences among Giant Stars in NGC 188.** *Robert D. McClure.* **194**, 355, 78-E6
- The Gap in the Two-Color Diagram of Main-Sequence Stars.** *E. Böhm-Vitense and R. Canterna.* **194**, 629, 83-A1
- Are All Blue Stragglers Close Binaries?** *Paul Hintzen, John Scott, and John Whelan.* **194**, 657, 83-C2
- Orion Nebula**
- The Structure of the Orion Nebula. I. Observations of the C 85α Recombination Line.** *B. Balick, R. H. Gammon, and L. H. Doherty.* **188**, 45, 10-D3
 - Recombination Lines from H I Gas toward Orion.** *E. J. Chaisson and C. J. Lada.* **189**, 227, 22-E3
 - 1-Millimeter Observations of the Galactic H II Regions M42 and DR 21.** *Peter A. R. Ade, Peter E. Clegg, and John D. G. Rather.* **189**, L23, 21-A7
 - Detection of Possible Maser Emission near 3.48 Millimeters from an Unidentified Molecular Species in Orion.** *L. E. Snyder and D. Buhl.* **189**, L31, 21-B1
 - Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission.** *P. M. Harvey, J. Gatley, M. W. Werner, J. H. Elias, N. J. Evans II, B. Zuckerman, G. Morris, T. Sato, and M. M. Litvak.* **189**, L87, 24-F13
 - Observational Evidence for the Excitation of HCN and H₂O in Protostellar Molecular Clouds.** *Frank O. Clark, David Buhl, and Lewis E. Snyder.* **190**, 545, 35-D10
 - CO and CS in the Orion Nebula.** *H. S. Liszt, R. W. Wilson, A. A. Penzias, K. B. Jefferts, P. G. Wannier, and P. M. Solomon.* **190**, 557, 35-E8
 - Possible Evidence for a Large Magnetic Field in the Orion Infrared Nebula.** *C. A. Beichman and E. J. Chaisson.* **190**, L21, 30-E11
 - Search for Deuterium in Orion and Detection of High-Velocity Features.** *W. A. Traub, N. P. Carleton, and D. J. Hegyi.* **190**, L81, 34-A4
 - Vibrationally Excited Silicon Monoxide in the Orion Nebula.** *J. H. Davis, G. N. Blair, H. Van Till, and P. Thaddeus.* **190**, L117, 37-F13
 - Large-Scale Wave Structure in the Orion Molecular Cloud.** *T. G. Phillips, K. B. Jefferts, P. G. Wannier, and P. A. R. Ade.* **191**, L31, 42-C5
 - 350-Micron Mapping of the Orion Molecular Cloud.** *D. Y. Gezari, R. R. Joyce, G. Righini, and M. Simon.* **191**, L33, 42-C7
 - Radio Detection of Interstellar Dimethyl Ether.** *L. E. Snyder, D. Buhl, P. R. Schwartz, F. O. Clark, D. R. Johnson, F. J. Lovas, and P. T. Giguere.* **191**, L79, 46-C7
 - Submillimeter Observations of the Orion Nebula and NGC 2024.** *B. T. Soifer and H. S. Hudson.* **191**, L83, 46-C11
 - Magnetic Fields in the Orion Molecular Cloud from the Zeeman Effect in SO.** *F. O. Clark and D. R. Johnson.* **191**, L87, 46-D1
 - A New Infrared Complex and Molecular Cloud in Orion.** *J. Gatley, E. E. Becklin, K. Matthews, G. Neugebauer, M. V. Penston, and N. Scoville.* **191**, L121, 49-B6
 - Maps of Spatial and Kinematic Structure of Galactic Nebulae. I. H 76α Studies of M17, M42, W51, and DR 21.** *T. R. Gull and B. Balick.* **192**, 63, 50-E1
 - Far-Infrared Emission from H II Regions. II. Multicolor Photometry of Selected Sources and 2.2 Resolution Maps of M42 and NGC 2024.** *D. A. Harper.* **192**, 557, 57-C4
 - A High-Resolution Map of the Orion Nebula Region at Far-Infrared Wavelengths.** *G. G. Fazio, D. E. Kleinmann, R.*

- Orion Nebula — Continued**
- W. Noyes, E. L. Wright, M. Zeilik II, and F. J. Low.* **192**, L23, 53-B8
 - The New Molecular Cloud in Orion. *M. Morris, B. Zuckerman, B. E. Turner, and Patrick Palmer.* **192**, L27, 53-B11
 - 1-Millimeter Continuum Radiation from Orion Molecular Cloud 2. *M. W. Werner, J. H. Elias, D. Y. Gezari, and W. E. Westbrook.* **192**, L31, 53-C1
 - On the Spectrum of Neutral Oxygen in the Orion Nebula. *Guido Münch and Keith Taylor.* **192**, L93, 57-G10
 - Silicon Monoxide: Detection of Maser Emission from the Second vibrationally Excited State. *David Buhl, Lewis E. Snyder, Frank J. Lovas, and Donald R. Johnson.* **192**, L97, 58-A1
 - A New DCN Line: DCN(HCN) Excitation. *T. G. Phillips, K. B. Jefferts, and P. G. Wannier.* **192**, L153, 62-A5
 - Kinematics of the Orion A Molecular Cloud. *R. A. Linke and P. G. Wannier.* **193**, L41, 66-C11
 - 20 to 40 Micron Spectroscopy of the Orion Nebula. *J. R. Houck, D. F. Schaa, and R. A. Reed.* **193**, L139, 73-A7
 - Observations of Infrared Polarization in the Orion Nebula. *H. M. Dyck and C. A. Beichman.* **194**, 57, 74-E9
 - The Scattering by Dust in the Orion Nebula. *F. H. Schiffer III and John S. Mathis.* **194**, 597, 82-E8
- Peculiar A Stars**
- The Variations of the Magnetic Ap Star 49 Camelopardalis. *Walter K. Bonsack, Catherine A. Pilachowski, and Sidney C. Wolff.* **187**, 265, 4-D7
 - The Orientation of Magnetic Axes in Ap Stars: An Alternative Interpretation of the Component with Small Oblliquity. *Ermanno F. Borra.* **187**, 271, 4-D13
 - On the Abundance of Europium. *Mark R. Hartoog, Charles R. Cowley, and Saul J. Adelman.* **187**, 551, 8-C1
 - On the Interpretation of the Magnetic Curves of the Ap Stars as Determined by the Photographic Technique. *Ermanno F. Borra.* **188**, 287, 13-F9
 - The Extraordinarily Slow Magnetic Variation of Gamma Equulei. *Walter K. Bonsack and Catherine Pilachowski.* **190**, 327, 31-G4
 - The Holmium Ap Star HD 51418. *Terry J. Jones, Sidney C. Wolff, and Walter K. Bonsack.* **190**, 579, 35-G2
 - Selected Line Identifications in the Ultraviolet Spectrum of Gamma Equulei. *Saul J. Adelman.* **190**, 743, 37-E1; Suppl. **27**, 183 (No. 242)
 - The Peculiar A Star HD 215441. *Saul J. Adelman.* **190**, 743, 37-E1; Suppl. **27**, 203 (No. 242)
 - Magnetic Fields and Diffusion Processes in Peculiar A Stars. *Steven N. Shore and Saul J. Adelman.* **191**, 165, 40-E11
 - Rapid Line Variability. I. The Ap Stars Epsilon Ursae Majoris and 73 Draconis. *Michel Breger.* **192**, 71, 50-E14
 - Harmonic Analysis of the Line Profiles of an Oblique Rotator. *Alfred E. Falk and William H. Wehlau.* **192**, 409, 55-F13
 - The Peculiar A Star HD 200311: A Photographic-Region Line-Identification Study. *Saul J. Adelman.* **192**, 573, 57-D5; Suppl. **28**, 51 (No. 254)
 - The Peculiar A Star HD 168733. II. A Model-Atmosphere Analysis. *Stephen J. Little.* **193**, 639, 71-C8
 - The Manganese Stars. *Sidney C. Wolff and Richard J. Wolff.* **194**, 65, 74-F3
 - Element Identifications in Five Ap Stars. *Charles R. Cowley, Mark R. Hartoog, and Anne P. Cowley.* **194**, 343, 78-D5
- Photometry**
- Short-Term Spectral Variability of γ^2 Velorum. Photometric Observations. *A. Sanyal, W. Weller, and S. Jeffers.* **187**, L31, 3-D1
 - Pre-Main-Sequence Stars. III. Herbig Be/Ae Stars and Other Selected Objects. *Michel Breger.* **188**, 53, 10-D11
 - Are 2-Micron Absorptions and 11-Micron Emissions of M Stars Related? *Theodore D. Fay, Jr.* **188**, 553, 17-A12
 - Infrared Fluxes, Spectral Types, and Temperatures for Very Cool Stars. *H. M. Dyck, G. W. Lockwood, and R. W. Capps.* **189**, 89, 19-G7
 - Three-Color Photometry of the Flare Star EV Lacertae. *T. R. Flesch and J. P. Oliver.* **189**, L127, 27-E1
 - Four-Color Observations of Early-Type Stars. IV. South Galactic Pole. *A. G. Davis Philip.* **190**, 573, 35-F10
 - On the C2, CN, and CO Indices of Carbon Stars. *Theodore D. Fay, Jr.* **190**, 597, 36-A4
 - Optical Studies of Uhuru Sources. VIII. Observations of 92 Possible Counterparts of X-Ray Sources. *C. A. Jones, Timur Chetin, and W. Liller.* **190**, L1, 30-D4
 - Nonperiodic Optical Flickering in HZ Herculis. *T. J. Moffett, R. E. Nather, and P. A. Vanden Bout.* **190**, L63, 33-G1
 - A Preliminary Photoelectric Sequence in the Galaxy M33 of the Local Group. *Allan Sandage and Harold L. Johnson.* **191**, 63, 39-E13
 - Submillimeter Observations of the Orion Nebula and NGC 2024. *B. T. Soifer and H. S. Hudson.* **191**, L83, 46-C11
 - Calibrations and Applications of the uvby Photometric System. *Michel Breger.* **192**, 75, 50-F4
 - Further Observations of Stars in the Intermediate-Age Open Cluster NGC 2477. *F. D. A. Hartwick and James E. Hesser.* **192**, 391, 55-E7
 - Ultraviolet Television Data from the Orbiting Astronomical Observatory. II. Stellar Ultraviolet Colors and Interstellar Extinction. *Eric Peytremann and Robert J. Davis.* **192**, 815, 61-C12; Suppl. **28**, 211 (No. 260)
 - An Empirical Line Blanketing Study of Am Stars. A. *Eric Rydgren and Myron A. Smith.* **193**, 125, 64-C1
 - The Distance to the Hyades Cluster from R-I Photometry. *A. R. Upgren.* **193**, 359, 67-E9
 - UBVr Colors for Population II Giants. *Erika Böhm-Vitense and Paula Szkody.* **193**, 607, 71-A4
 - An Additional Constraint on the Early Evolution of the Galaxy from New Observations of 47 Tucanae. *F. D. A. Hartwick and James E. Hesser.* **194**, L129, 84-E2
- Planetary Nebulae**
- Filamentary Structure in Planetary Nebulae. *Gregory O. Boeshaar.* **187**, 283, 4-E10
 - Radio Synthesis Observations of Planetary Nebulae. *Yervant Terzian, Bruce Balick, and Carl Bignell.* **188**, 257, 13-D8
 - Nebular Photometry with an Echelle Spectrometer: [O III] Line Ratios in NGC 1976 and NGC 6853. *T. J. Bohuski, R. J. Dufour, and D. E. Osterbrock.* **188**, 529, 16-F14
 - High Helium Abundances in Two Planetary Nebulae. *James B. Kaler.* **188**, L15, 12-D1
 - FG Sagittae: The s-Process Episode. *G. E. Langer, Robert P. Kraft, and Kurt S. Anderson.* **189**, 509, 26-B5
 - An Interpretation of the Puzzling Observations of FG Sagittae. *I. Julianne Christy-Sackmann and Keith H. Despain.* **189**, 523, 26-C4
 - Observations for Broad-Band Circular Polarization in White Dwarfs and Nuclei of Planetary Nebulae. *A. Rich and W. L. Williams.* **190**, 117, 29-B8
 - Infrared Emission by Dust in NGC 1068 and Three Planetary Nebulae. *R. F. Jameson, A. J. Longmore, J. A. McLinn, and N. J. Woolf.* **190**, 353, 32-B2
 - Models for Nuclei of Planetary Nebulae and Ultraviolet Stars. *J. I. Katz, R. C. Malone, and E. E. Salpeter.* **190**, 359, 32-B8
 - Spectrophotometric Studies of Gaseous Nebulae. XXIII. The Planetary Nebula NGC 6803. *P. Lee, L. H. Aller, J. B. Kaler, and S. J. Czyzak.* **192**, 159, 51-D10
 - Radio-Continuum Measurements of Planetary Nebulae at 15.5 GHz. *Gopal Sistla, G. Kojoian, and E. J. Chaissson.* **192**, 165, 51-E1
 - Studies of Hydrodynamic Events in Stellar Evolution. III. Ejection of Planetary Nebulae. *G. S. Kutter and Warren M. Sparks.* **192**, 447, 56-B9
 - V1016 Cygni: Spectral Observations 1969-1973. *M. Pim Fitzgerald and Andrea Pilavaki.* **192**, 575, 57-D7; Suppl. **28**, 147 (No. 258)

- On the Ultraviolet Radiation in the Galaxy.** *Yervant Terzian.* **193**, 93, 63-G10
- Old Planetary Nebulae and the Relation between Size and Expansion Velocity.** *Thomas J. Bohuski and Malcolm G. Smith.* **193**, 197, 65-A1
- Spectrophotometric Observations of NGC 6543.** *G. O. Boeshaar, S. J. Czyzak, and L. H. Aller.* **193**, 290, 65-G6; *Suppl.* **28**, 335 (No. 264)
- An Infrared Photometric Survey of Planetary Nebulae.** *Martin Cohen and Michael J. Barlow.* **193**, 401, 68-A8
- Recombination Lines in Planetary Nebulae at 15 Gigahertz.** *R. C. Bignell.* **193**, 687, 71-G3
- The Influence of Dust upon the Dynamics and Stability of Planetary Nebulae. II.** *James H. Hunter, Jr., and Stephen L. Nightingale.* **193**, 693, 71-G9
- Plasmas**
- Solar Cosmic-Ray Acceleration by a Plasma Instability** *S. Peter Gray.* **187**, 195, 2-G6
 - Laser-Plasma Spectra of Highly Ionized Fluorine.** *U. Feldman, G. A. Doschek, D. J. Nagel, W. E. Behring, and R. D. Cowan.* **187**, 417, 5-G11
 - Acceleration of the Solar Wind by the Interplanetary Magnetic Field.** *Aaron Barnes.* **188**, 645, 18-A6
 - Stably Trapped Proton Fluxes in the Jovian Magnetosphere.** *F. V. Coroniti, C. F. Kennel, and R. M. Thorne.* **189**, 383, 24-B13
 - Photon Opacity in Surfaces of Magnetic Neutron Stars.** *J. Lodenguai, V. Canuto, M. Ruderman, and S. Tsuruta.* **190**, 141, 29-D3
 - A Note on Summing Series of Bessel Functions Occurring in Certain Plasma Astrophysical Situations. I.** *Lerche.* **190**, 165, 29-E12
 - Polarization of Inverse Plasmon Scattering.** *R. A. Windsor and P. J. Kellogg.* **190**, 167, 29-E14
 - Stabilization of Electron Streams in Type III Solar Radio Bursts.** *Konstantinos Papadopoulos, Melvyn L. Goldstein, and Robert A. Smith.* **190**, 175, 29-F7
 - Solar-Flare and Laboratory Plasma Phenomena.** *Tong Nyong Lee.* **190**, 467, 33-C3
 - On the Significance of the Cerenkov Process in Quasi-stellar Objects.** *Jeffrey D. Colvin.* **190**, 515, 35-A10
 - Index of Refraction of Plasma in Motion.** *Moshe Elitzur.* **190**, 673, 36-G4
 - Penetration of a Low-Frequency Magnetic Wave into a Nebula Plasma.** *William K. Rose, Nicholas A. Krall, and Paulett C. Liewer.* **191**, 201, 41-A3
 - Electron-Ion Relaxation in a Dense Plasma.** *J. E. Littleton and J.-R. Buchler.* **191**, 731, 48-C5
 - Static Equilibria of the Interstellar Gas in the Presence of Magnetic and Gravitational Fields: Large-Scale Condensations.** *Telemachos Ch. Mouschovias.* **192**, 37, 50-C5
 - Satellite Line Spectra from Laser-produced Plasmas.** *U. Feldman, G. A. Doschek, D. J. Nagel, R. D. Cowan, and R. R. Whitlock.* **192**, 213, 52-A6
 - Rotating Magnetospheres: Acceleration of Plasma from the Surface.** *F. Curtis Michel.* **192**, 713, 60-C10
 - The Urca Process in Dense Stellar Interiors.** *Richard G. Couch and Gregory L. Loumos.* **194**, 385, 78-G9
 - Plasma-screening Effects upon Atomic Hydrogen Photoabsorption.** *Jon C. Weisheit and Bruce W. Shore.* **194**, 519, 80-C6
 - Relativistic-Particle Beam Instabilities and X-Ray Pulse Production by the Crab Pulsar.** *Philip E. Hardee and William K. Rose.* **194**, L35, 76-E9
 - The Impossibility of Plasma Radiation from Electron Plasma Wave Turbulence within Collisionless Shock Waves.** *Dean F. Smith and N. A. Krall.* **194**, L163, 84-G8
 - Polarization**
 - The Transfer of Circularly Polarized Radiation.** *George W. Collins II and Paul F. Buerger.* **187**, 163, 2-E7
 - Interstellar Polarization from a Medium with Changing Grain Alignment.** *P. G. Martin.* **187**, 461, 7-C10
 - Interstellar Circular Polarization: A Report of Eight New Positive Results.** *J. J. Michalsky, Jr., J. B. Swedlund, R. A. Stokes, and R. W. Avery.* **187**, L13, 3-B11
 - Observations of Structure in the Interstellar Polarization Curve: Preliminary Results.** *G. E. Mavko, D. S. Hayes, J. M. Greenberg, and W. A. Hiltner.* **187**, L117, 9-E9
 - Discovery of Time-varying Circular and Linear Polarization in the White-Dwarf Suspect GD 229.** *John B. Swedlund, Ramon D. Wolstencroft, Joseph J. Michalsky, Jr., and James C. Kemp.* **187**, L121, 9-E12
 - Pre-Main-Sequence Stars. III. Herbig Be/Ae Stars and Other Selected Objects.** *Michel Breger.* **188**, 53, 10-D11
 - Polarization by Rotationally Distorted Electron-Scattering Atmospheres.** *Joseph P. Cassinelli and Bernhard M. Haisch.* **188**, 101, 11-A13
 - Physics of Compact Nonthermal Sources. I. Theory of Radiation Processes.** *T. W. Jones, S. L. O'Dell, and W. A. Stein.* **188**, 353, 14-D2
 - A Study of Interstellar Polarization at the $\lambda\lambda$ 4430 and 5780 Features in HD 183143.** *P. G. Martin and J. R. P. Angel.* **188**, 517, 16-F4
 - Individual Pulse Polarization Properties of Three Pulsars.** *John M. Rankin, D. B. Campbell, and D. C. Backer.* **188**, 609, 17-E10
 - Infrared Polarization of the Galactic Nucleus.** *H. M. Dyck, R. W. Capps, and C. A. Beichman.* **188**, L103, 18-D13
 - Gravitational Stokes Parameters.** *A. Marcello Anile and Reinhard A. Breuer.* **189**, 39, 19-D1
 - Effect of Faraday Rotation on the Circular Polarization of the Crab Nebula.** *Michael J. Gerver.* **189**, 249, 22-F13
 - The Polarization of Normal Galaxies at Radio Wavelengths.** *J. F. C. Wardle and R. A. Sramek.* **189**, 399, 25-A4
 - On the Linear Polarization of GD-229.** *James C. Kemp, George V. Coyne, S. J., John B. Swedlund, and Ramon D. Wolstencroft.* **189**, L79, 24-F6
 - Observations for Broad-Band Circular Polarization in White Dwarfs and Nuclei of Planetary Nebulae.** *A. Rich and W. L. Williams.* **190**, 117, 29-B8
 - Photon Opacity in Surfaces of Magnetic Neutron Stars.** *J. Lodenguai, V. Canuto, M. Ruderman, and S. Tsuruta.* **190**, 141, 29-D3
 - Polarization of Inverse Plasmon Scattering.** *R. A. Windsor and P. J. Kellogg.* **190**, 167, 29-E14
 - Optical Polarization of the Crab Nebula Pulsar. III. New Observations, Predictions, and the Possibility of Variability.** *D. C. Ferguson, W. J. Cocke, and T. Gehrels.* **190**, 375, 32-C10
 - Possible Evidence for a Large Magnetic Field in the Orion Infrared Nebula.** *C. A. Beichman and E. J. Chaisson.* **190**, L21, 30-E11
 - The Wavelength Dependence of Circular Polarization in GD 229.** *J. D. Landstreet and J. R. P. Angel.* **190**, L25, 30-F1
 - G240-72: A New Magnetic White Dwarf with Unusual Polarization.** *J. R. P. Angel, P. Hintzen, P. A. Strittmatter, and P. G. Martin.* **190**, L71, 33-G9
 - BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations.** *B. H. Andrew, G. A. Harvey, W. J. Medd, K. R. Hackney, R. L. Scott, A. G. Smith, R. J. Leacock, B. Q. McGimsey, E. E. Epstein, J. W. Montgomery, J. Mottman, and R. B. Popham.* **191**, 51, 39-E1
 - The Stokes Parameters for Light Arising from Induced Processes.** *G. C. Pomraning.* **191**, 183, 40-G1
 - A Determination by the Zeeman Effect of the Magnetic Field Strength in the White Dwarf G99-37.** *J. R. P. Angel and J. D. Landstreet.* **191**, 457, 44-E12
 - Radiative Transfer of Partially Polarized Light.** *C. Acquista and J. L. Anderson.* **191**, 567, 45-F2
 - The Position and Stokes Parameters of the Integrated 21-Centimeter Radio Emission of Jupiter and Their Variation with Epoch and Central Meridian Longitude.** *Glenn L. Berge.* **191**, 775, 48-F5
 - Further Observations for Circularly Polarized Radiation from White Dwarfs and X-Ray Sources.** *D. N. Brown, A. Rich,*

- Polarization — Continued**
- and W. L. Williams. **191**, L111, 49-A11
- Comparison of the Optical Spectrum of the Filaments with the Spectrum of the Central Region of M82. Natarajan Visvanathan. **192**, 319, 54-F11
- Polarization of Radio Sources. V. Absorption Effects on Circular Repolarization in Compact Sources. A. G. Pacholczyk and T. L. Swihart. **192**, 591, 59-B8
- The Small-Scale, Quasi-periodic, Disk Component of Solar Radio Radiation. Kenneth R. Lang. **192**, 777, 61-A2
- Solution of the Inhomogeneous Rayleigh Scattering Atmosphere. M. J. Prather. **192**, 787, 61-A13
- Infrared Polarization of NGC 1068. R. F. Knacke and R. W. Capps. **192**, L19, 53-B4
- DQ Herculis: Weak Sister to HZ Herculis. D. Q. Lamb. **192**, L129, 61-F11
- Observations at Wavelengths of 2.2 and 4.5 Centimeters of the Linear Polarization of Radio Galaxies and Quasars. Jacques P. Vallee and Philipp P. Kronberg. **193**, 303, 67-A13
- A Study of Birefringence in the Interstellar Medium in the Direction of the Crab Nebula. P. G. Martin and J. R. P. Angel. **193**, 343, 67-D9
- DQ Herculis: Periodic Circular Polarization Synchronous with the Rapid Light Variations. John B. Swedlund, James C. Kemp, and Ramon D. Wolstencroft. **193**, L11, 66-A12
- DQ Herculis: Periodic Linear Polarization Synchronous with the Rapid Light Variation. James C. Kemp, John B. Swedlund, and Ramon D. Wolstencroft. **193**, L15, 66-B1
- Observations of Infrared Polarization in the Orion Nebula. H. M. Dyck and C. A. Beichman. **194**, 57, 74-E9
- The Linear Polarization of Quasi-stellar Radio Sources at 3.71 and 11.1 Centimeters. J. F. C. Wardle and P. P. Kronberg. **194**, 249, 77-C14
- Four-Stokes-Parameter Radiofrequency Polarimetry of a Flare from AD Leonis. Steven R. Spangler, John M. Rankin, and Stanley D. Shawhan. **194**, L43, 76-F2
- Population II Stars**
- Formation of ^{14}N by $^{14}\text{N}(\text{e}^-, \nu)^{14}\text{C}(\alpha, \gamma)^{18}\text{O}$ in Degenerate Matter. R. Mitras. **187**, 155, 2-D14
- Do Helium-Shell Flashes Cause Extensive Mixing in Low-Mass Stars? Allen V. Sweigart. **189**, 289, 23-C2
- Theoretical Evolution of Extremely Metal-poor Stars. Raymond L. Wagner. **191**, 173, 40-F5
- Asymptotic Giant-Branch Evolution of a 0.6 M_{\odot} Star. Robert A. Gingold. **193**, 177, 64-F11
- UBV ν Colors for Population II Giants. Erika Böhm-Vitense and Paula Szkody. **193**, 607, 71-A4
- Neutral Helium Line Strengths. VII. The Population II B Star Barnard 29 in M13. L. H. Auer and John Norris. **194**, 87, 74-G12
- The Subgiant CH Stars. Howard E. Bond. **194**, 95, 75-A5
- An Additional Constraint on the Early Evolution of the Galaxy from New Observations of 47 Tucanae. F. D. A. Hartwick and James E. Hesser. **194**, L129, 84-E2
- Pre-Main-Sequence Stars**
- An Infrared Source Associated with a Herbig-Haro Object. K. M. Strom, S. E. Strom, and G. L. Grasdalen. **187**, 83, 1-F12
- On the Nature of BD-10°4662. R. R. Zappala. **187**, 257, 4-D1
- Pre-Main-Sequence Stars. III. Herbig Be/Ae Stars and Other Selected Objects. Michel Breger. **188**, 53, 10-D11
- Radio Emission from Pre-Main-Sequence Stars. John H. Spencer and Philip R. Schwartz. **188**, L105, 18-E1
- The Coalsack. III. A Search for T Tauri Stars. Wm. Bruce Weaver. **189**, 263, 22-G12
- Infrared and Optical Observations of Herbig-Haro Objects. S. E. Strom, G. L. Grasdalen, and K. M. Strom. **191**, 111, 40-B6
- Fe I Fluorescence in T Tauri Stars. L. A. Willson. **191**, 143, 40-D4
- The T Tauri Emission Nebula. Richard D. Schwartz. **191**, 419, 44-C3
- Optical Polarization of Selected Herbig-Haro Objects. K. M. Strom, S. E. Strom, and T. D. Kinman. **191**, L93, 46-D6
- The Continuous Spectrum of Herbig-Haro Objects. K.-H. Böhm, R. D. Schwartz, and W. A. Siegmund. **193**, 353, 67-E4
- Molecular Studies of Two Dark Nebulae Associated with Herbig-Haro Objects. C. J. Lada, C. A. Gottlieb, M. M. Litvak, and A. E. Lilley. **194**, 609, 82-F6
- A Strong Water Maser Associated with a Herbig-Haro Object. Dale F. Dickinson, Gabriel Kojoian, and Stephen E. Strom. **194**, L93, 80-G4
- Collapsing Molecular Clouds? Robert B. Loren, William L. Peters, and Paul A. Vanden Bout. **194**, L103, 81-A1
- Prominences, Solar**
- Theoretical Helium I Emission-Line Intensities for Quiescent Prominences. J. N. Heasley, Dimitri Mihalas, and A. I. Poland. **192**, 181, 51-F4
- Proper-Motion Stars**
- Detection of Pulsar Proper Motion. R. N. Manchester, J. H. Taylor, and Y. Y. Van. **189**, L119, 27-D6
- A Spectroscopic Search for Cool White Dwarfs. Paul Hintzen and P. A. Strittmatter. **193**, L111, 72-F5
- Proper Motions: see Stellar Dynamics**
- Pulsars**
- "Lorentz Force-free" Pulsar Rotating Fields. V. G. Endean. **187**, 359, 5-C14
- On the Passage of Radiation through Inhomogeneous, Moving Media. I. The Plane, Differentially Sheared Medium. I. Lerche. **187**, 589, 8-E11
- On the Passage of Radiation through Inhomogeneous, Moving Media. II. The Rotating, Differentially Shearing Medium. Ian Lerche. **187**, 597, 8-F5
- Search for Gravitational Radiation from Pulsars. Terry S. Mast, Jerry E. Nelson, and John A. Saarloos. **187**, L49, 6-B2
- Cosmic Gamma-Ray Bursts from Relativistic Dust Grains. Jonathan E. Grindlay and G. G. Fazio. **187**, L93, 9-D2
- Individual Pulse Polarization Properties of Three Pulsars. John M. Rankin, D. B. Campbell, and D. C. Backer. **188**, 609, 17-E10
- Compounds in Neutron-Star Crusts. T. A. Witten, Jr. **188**, 615, 17-F5
- On the Passage of Radiation through Inhomogeneous, Moving Media. III. The Steady-State Fields of Inertial Charge Distributions. I. Lerche. **188**, 627, 17-G3
- Structure of the Local Galactic Magnetic Field. R. N. Manchester. **188**, 637, 17-G12
- On the Numbers, Birthrates, and Final States of Moderate- and High-Mass Stars. J. P. Ostriker, D. O. Richstone, and T. X. Thuan. **188**, L87, 18-C14
- Pulsar Flux-Density Spectra. D. C. Backer and J. R. Fisher. **189**, 137, 20-D1
- An Upper Limit on Soft X-Ray Pulsations from the Pulsar PSR 0833-45. W. E. Moore, P. C. Agrawal, and G. Garmire. **189**, L117, 27-D4
- Detection of Pulsar Proper Motion. R. N. Manchester, J. H. Taylor, and Y. Y. Van. **189**, L119, 27-D6
- Pulsar Magnetic Axis Alignment and Counteralignment. William W. Macy, Jr. **190**, 153, 29-E1
- Optical Polarization of the Crab Nebula Pulsar. III. New Observations, Predictions, and the Possibility of Variability. D. C. Ferguson, W. J. Cocke, and T. Gehrels. **190**, 375, 32-C10
- Interstellar Scattering of the Vela Pulsar. D. C. Backer. **190**, 667, 36-F13
- Index of Refraction of Plasma in Motion. Moshe Elitzur. **190**, 673, 36-G4
- Detection of Soft X-Ray Emission from PSR 0833-45. J. L. Culhane, A. M. Cruise, C. G. Rapley, and F. J. Hawkins. **190**, L9, 30-D13
- The Absence of Radio Emission from HZ Herculis. Lee Hartmann and Alan S. Lapedes. **190**, L67, 33-G5
- A New Measurement of the Hercules X-1 X-Ray Pulse Profile. S. S. Holt, E. A. Boldt, R. E. Rothschild, J. L. R. Saba, and P. J. Serlemitsos. **190**, L109, 37-F7
- On the Passage of Radiation through Inhomogeneous, Moving

- Media. IV. Radiative Transfer under Single-Particle Compton Scattering. *J. Lerche*. **191**, 191, 40-G8
- Pulsar-Supernova-Remnant Pairs and the Galactic Gravitational Field. *Eric M. Jones*. **191**, 207, 41-A8
- An Exact Study of Rigidly and Rapidly Rotating Stars in General Relativity with Application to the Crab Pulsar. *Silvano Bonazzola and Jean Schneider*. **191**, 273, 41-F2
- Do Pulsars Make Supernovae? II. Calculations of Light Curves for Type II Events. *Peter Bodenheimer and Jeremiah P. Ostriker*. **191**, 465, 44-F6
- Structure of Solid Iron in Superstrong Neutron-Star Magnetic Fields. *Hsing-Hen Chen, Malvin A. Ruderman, and Peter G. Sutherland*. **191**, 473, 44-F13
- On the Passage of Radiation through Inhomogeneous, Moving Media. V. Line Absorption and Frequency Variations of Optical Depth. *J. Lerche*. **191**, 753, 48-D13
- On the Passage of Radiation through Inhomogeneous, Moving Media. VI. Dispersion Effects on Phase and Ray Paths in a Plane, Differentially Shearing Medium. *J. Lerche*. **191**, 759, 48-E4
- A High-Sensitivity Pulsar Survey. *R. A. Hulse and J. H. Taylor*. **191**, L59, 46-B3
- Period Irregularities in Pulsars. *R. N. Manchester and J. H. Taylor*. **191**, L63, 46-B6
- Analytic Pulsar Models. *Richard C. Adams, Jeffrey M. Cohen, Ronald J. Adler, and Charles Sheffield*. **192**, 525, 57-A1
- On the Axisymmetric Pulsar Atmosphere. *Satoshi Hinata and E. Atlee Jackson*. **192**, 703, 60-C1
- Rotating Magnetospheres: Acceleration of Plasma from the Surface. *F. Curtis Michel*. **192**, 713, 60-C10
- Mass Limits for the Centaurus X-3 System. *Y. Avni and J. N. Bahcall*. **192**, L139, 61-G6
- Aligned Rotating Magnetospheres. II. Inclusion of Inertial Forces. *Ernst T. Scharlemann*. **193**, 217, 65-B6
- Pulsar Near Fields. *Jeffrey L. Parish*. **193**, 225, 65-B13
- VLB Observations of the Crab Nebula and the Wavelength Dependence of Interstellar Scattering. *R. L. Mutel, J. J. Broderick, T. D. Carr, M. Lynch, M. Desch, W. W. Warnock, and W. K. Klempner*. **193**, 279, 65-F9
- Stars in the Mass Range $7 < M/M_{\odot} < 10$ as Candidates for Pulsar Progenitors. *Z. Barkat, Y. Reiss, and G. Rakavy*. **193**, L21, 66-B6
- Uhuru Observations of Short-Time-Scale Variations of the Crab. *W. Forman, R. Giacconi, C. Jones, E. Schreier, and H. Tananbaum*. **193**, L67, 69-C12
- The Crab Nebula Pulsar: Radiofrequency Spectral Variability. *John M. Rankin, R. R. Payne, and D. B. Campbell*. **193**, L71, 69-D2
- On the Passage of Radiation through Inhomogeneous, Moving Media. VIII. Ray Paths and Fluxes in a Plane Differentially Sheared Medium. *Martin A. Lee*. **194**, 165, 75-F6
- On the Passage of Radiation through Inhomogeneous, Moving Media. IX. An Initial-Value Problem and an Oscillatory "Steady-State" Problem. *J. Lerche*. **194**, 177, 75-G3
- On the Passage of Radiation through Inhomogeneous, Moving Media. X. Ray and Phase Paths in Arbitrary Velocity Fields. *J. Lerche*. **194**, 403, 79-A12
- On the Passage of Radiation through Inhomogeneous, Moving Media. XI. Nonlinear Effects on Ray Paths in the Geometrical Optics Approximation. *M. A. Lee and J. Lerche*. **194**, 409, 79-B4
- Color-Difference Photometry of the Crab Nebula Pulsar and the Rotating Relativistic Vector Model. *W. J. Cocke and D. C. Ferguson*. **194**, 725, 83-G10
- Relativistic-Particle Beam Instabilities and X-Ray Pulse Production by the Crab Pulsar. *Philip E. Hardee and William K. Rose*. **194**, L35, 76-E9
- Pulsation**
- Relativistic Terms in Nonlinear Pulsation Theory. *Cecil G. Davis*. **187**, 175, 2-F4
- Thermal Pulses in Helium Shell-burning Stars. III. *R. A. Gingold and D. J. Faulkner*. **188**, 145, 11-D11
- A Case of Metastability for Slowly Rotating, Supermassive Objects. *Helena Dedic and Jean-Louis Tassoul*. **188**, 173, 11-F11
- Correlation Analysis of X-Ray Emission from Cygnus X-1. *A. C. Brinkman, D. R. Parsignault, E. Schreier, H. Gursky, E. M. Kellogg, H. Tananbaum, and R. Giacconi*. **188**, 603, 17-E3
- Upper Limit on 2.5-Second Pulsations from Hercules X-1. *Y. Avni, J. N. Bahcall, P. C. Joss, E. Schreier, H. Tananbaum, and D. Q. Lamb*. **188**, L35, 15-D6
- Pulsational Stability of Stars in Thermal Imbalance. II. An Energy Approach. *William R. Davey and John P. Cox*. **189**, 113, 20-B5
- A Comparison of Variable and Nonvariable Stars in the Cepheid Strip. *Edward G. Schmidt, Jeffrey D. Rosenthal, and C. P. Jewsbury*. **189**, 293, 23-C5
- High-Frequency Stellar Oscillations. X. The Rapid Blue Variable CD-42°14462. *James E. Hesser, Barry M. Lasker, and Patrick S. Osmer*. **189**, 315, 23-D14
- An Excitation Mechanism for Pulsations in Beta Cephei Stars. *Yoji Osaki*. **189**, 469, 25-F10
- The Doppler Splitting of Spectral Lines in Pulsating Stars. *Angelo James Skalafuris*. **190**, 91, 28-G10
- Models of Asymptotic-Giant-Branch Stars. *P. R. Wood*. **190**, 609, 36-B1
- On the Beat Phenomenon in the Beta Cephei Stars. *R. G. Deupree*. **190**, 631, 36-D1
- Coherent Oscillations in UX Ursae Majoris. *R. Edward Nather and E. L. Robinson*. **190**, 637, 36-D7
- Limits on Rapid X-Ray Pulsing in X-Ray Binaries. *G. Spada, H. Bradt, R. Doxsey, A. Levine, and S. Rappaport*. **190**, L113, 37-F10
- Theoretical Evolution of Extremely Metal-poor Stars. *Raymond L. Wagner*. **191**, 173, 40-F5
- Pulsational Stability of Stars in Thermal Imbalance. III. Analysis in Terms of Absolute Variations. *John P. Cox, William R. Davey, and Morris L. Aizenman*. **191**, 439, 44-D9
- The Beta Cephei Nature of Spica. *Robert J. Dukes, Jr.*. **192**, 81, 50-F10
- The Calculation of Periodic Pulsations of Stellar Models. *R. F. Stellingwerf*. **192**, 139, 51-C5
- Influence of Rotation on the Maximum Mass of Pulsationally Stable Stars. *Richard Stothers*. **192**, 145, 51-C11
- Optical Pulsations from the HZ Herculis-Hercules X-1 System. *Edward J. Groth*. **192**, 517, 56-G6
- High-Frequency Optical Variables. II. Luminosity-Variable White Dwarfs and Maximum Entropy Spectral Analysis. *Harvey B. Richer and Tad J. Ulrych*. **192**, 719, 60-D2
- Effects of Thermal Imbalance on the Pulsational Stability of Stars Undergoing Thermal Runaways. *J. P. Cox*. **192**, L85, 57-G3
- DQ Herculis: Weak Sister to HZ Herculis. *D. Q. Lamb*. **192**, L129, 61-F11
- X-Ray Emission from Vibrating White Dwarfs. *J. I. Katz and E. E. Salpeter*. **193**, 429, 68-C12
- Influence of Opacity on the Pulsational Stability of Massive Stars with Uniform Chemical Composition. II. Modified Kramers Opacity. *V. K. Sastri and Richard Stothers*. **193**, 677, 71-F7
- The 71-Second Variation of DQ Herculis. *William Herbst, James E. Hesser, and Jeremiah P. Ostriker*. **193**, 679, 71-F9
- Distinctive Patterns on the Surface of Slowly Rotating Stars Whose Oscillations Are Nonlinearly Coupled. *Charles L. Wolff*. **193**, 721, 72-B7
- Upper Limits to Optical Pulsations from Centaurus X-3. *C. R. Canizares and J. E. McClintock*. **193**, L65, 69-C10
- Rapid Light Variations of YZ Cancri: An Unusual SS Cygni Star. *Thomas J. Moffett and Thomas G. Barnes III*. **194**, 141, 75-D6
- Nonlinear, Adiabatic, Nonradial Stellar Pulsation: Calculations and Applications. *Robert G. Deupree*. **194**, 393, 79-A3
- Pulsational Stability of Stars in Thermal Imbalance. IV. Direct

Pulsation — Continued

- Solution of Differential Equation. *M. L. Aizenman and J. P. Cox.* **194**, 663, 83-C7
- Pulsational Stability of Stars in Thermal Imbalance. V. Eigen-solutions for Quasi-adiabatic Oscillations. *William R. Davy.* **194**, 687, 83-E2
- An Upper Limit to an X-Ray Point Source at the Center of the Cygnus Loop. *M. C. Weisskopf, H. Helava, and R. S. Wolff.* **194**, L71, 80-E10

Quantum Mechanics

- Some Properties of H_2CN^+ : A Potentially Important Interstellar Species. *Peter K. Pearson and Henry F. Schaefer III.* **192**, 33, 50-C1
- A-Type Doubling in the CD Molecule. *R. E. Hammersley and W. G. Richards.* **194**, L61, 76-G4

Quasi-stellar Sources or Objects

- Acceleration of QSO Clouds by Radiation Pressure. *Reuven Opher.* **187**, 5, 1-A6
- A Theory of Galactic Nuclei and Quasi-stellar Objects. *Reuven Opher.* **188**, 201, 12-A13
- Transfer of Resonance-Line Radiation in Differentially Expanding Atmospheres. III. Formation of P Cygni-Type Lines by a Doublet Line or Two Partially "Blended" Lines. *Thomas G. Hewitt and Peter D. Noerdlinger.* **188**, 315, 14-A8
- The Hubble Relation for Nonstandard Candles and the Origin of the Redshift of Quasars. *Vahé Petrosian.* **188**, 443, 16-A3
- Anisotropic Spheres in General Relativity. *Richard L. Bowers and E. P. T. Liang.* **188**, 657, 18-B3
- Are Quasars Dusty? *Christopher F. McKee and Vahé Petrosian.* **189**, 17, 19-B7
- Radiative Acceleration of Gas Clouds near Quasi-stellar Objects and Seyfert Galaxy Nuclei. *William G. Mathews.* **189**, 23, 19-B12
- QSO Envelopes: Optically Thin, Low Density, and Normal Abundances? *Jeffrey D. Scargle, Lawrence J. Caroff, and C. Bruce Tarter.* **189**, 181, 22-B2
- The Distance of BL Lacertae. *J. B. Oke and J. E. Gunn.* **189**, L5, 20-G4
- Further Observations of Apparent Changes in the Structure of 3C 273 and 3C 279. *K. I. Kellermann, B. G. Clark, D. B. Shaffer, M. H. Cohen, D. L. Jauncey, J. J. Broderick, and A. E. Niell.* **189**, L19, 21-A3
- Photoelectric Spectrophotometry of OQ 172 and OH 471. *J. B. Oke.* **189**, L47, 24-D5
- The Photometric History of the Object Identified with PKS 0537-441. *Wm. Liller.* **189**, L101, 27-C3
- Spectroscopy of Objects near Texas Radio-Source Positions. *D. Wills and Beverley J. Wills.* **190**, 271, 31-C3
- Spectroscopic Observations of Objects Identified with Radio Sources. *P. A. Strittmatter, R. F. Carswell, G. Gilbert, and E. M. Burbidge.* **190**, 509, 35-A4
- On the Significance of the Cerenkov Process in Quasi-stellar Objects. *Jeffrey D. Colvin.* **190**, 515, 35-A10
- 3C 66A: A Bright New Quasi-stellar Object. *Beverley J. Wills and D. Wills.* **190**, L97, 37-E6
- Molecular-Hydrogen Absorption Features in the Spectrum of Quasi-stellar Object 4C 05.34. *R. W. Carlson.* **190**, L99, 37-E9
- Optical Observations of the Radio Source 0735+178. *R. F. Carswell, P. A. Strittmatter, R. E. Williams, T. D. Kinman, and K. Serkowski.* **190**, L101, 37-E11
- The Double Quasar 1548+115a,b as a Gravitational Lens. *J. Richard Gott III and James E. Gunn.* **190**, L105, 37-F3
- On the Systematic Optical Identification of the Remaining 3C Radio Sources. I. A Search in 47 Fields. *Jerome Kristian, Allan Sandage, and Basil Karem.* **191**, 43, 39-C12
- The Interpretation of Broad Emission Lines in High-Redshift QSOs. *Ronald E. Stoner, Roger Ptak, and David Ellis.* **191**, 291, 43-A4
- The Significance of Radio Flux Variations in PKS 0735+178. *T. W. Jones.* **191**, L15, 42-B1
- A Search for Molecular Hydrogen in Quasar Absorption Spectra. *Marc Aaronson, John Harry Black, and Christopher F. McKee.* **191**, L53, 46-A10
- Physics of Compact Nonthermal Sources. II. Determination of Physical Parameters. *T. W. Jones, S. L. O'Dell, and W. A. Stein.* **192**, 261, 54-B8
- Polarization of Radio Sources. V. Absorption Effects on Circular Repolarization in Compact Sources. *A. G. Pacholezyk and T. L. Swihart.* **192**, 591, 59-B8
- On the Variability of the Compact Nonthermal Sources. *James L. Elliot and Stuart L. Shapiro.* **192**, L3, 53-A4
- Correlated Optical and Infrared Behavior of OJ 287 and Similar Radio Sources. *G. H. Rieke and T. D. Kinman.* **192**, L115, 61-E8
- On QSO and Seyfert Galaxy Line-Emission Models. *Gordon M. MacAlpine.* **193**, 37, 63-C12
- Physics of Compact Nonthermal Sources. III. Energetic Considerations. *G. R. Burbidge, T. W. Jones, and S. L. O'Dell.* **193**, 43, 63-D4
- The Structure of Radio Sources 3C 273B and 3C 84 Deduced from the "Closure" Phases and Visibility Amplitudes Observed with Three-Element Interferometers. *A. E. E. Rogers, H. F. Hinterberger, A. R. Whitney, C. C. Counselman, I. I. Shapiro, J. J. Wittels, W. K. Klempner, W. W. Warnock, T. A. Clark, L. K. Hutton, G. E. Marandino, B. O. Ronnang, O. E. H. Rydbeck, and A. E. Niell.* **193**, 293, 67-A4
- Observations at Wavelengths of 2.2 and 4.5 Centimeters of the Linear Polarization of Radio Galaxies and Quasars. *Jacques P. Vallee and Philipp P. Kronberg.* **193**, 303, 67-A13
- Optical Spectra and Redshifts of 4C Quasi-stellar Radio Sources. *Maarten Schmidt.* **193**, 505, 70-A4
- On the Nature of Faint Blue Objects in High Galactic Latitudes. III. A Spectroscopic Search for Quasars in Four Survey Fields. *Maarten Schmidt.* **193**, 509, 70-A7
- An Analysis of the Spectrum of the Large-Redshift Quasi-stellar Object OQ 172. *J. A. Baldwin, E. M. Burbidge, G. R. Burbidge, C. Hazard, L. B. Robinson, and E. J. Wampler.* **193**, 513, 70-A11
- Transfer of Line Radiation in Differentially Expanding Atmospheres. IV. The Two-Level Atom in Plane-parallel Geometry Solved by the Feautrier Method. *Peter D. Noerdlinger and George B. Rybicki.* **193**, 651, 71-D5
- Chance Coincidences in the Absorption-Line Spectrum of 4C 05.34. *Y. P. Varshni.* **193**, L5, 66-A6
- Quasar-Cluster Association as a Test of the Cosmological or Local Hypothesis. *M. B. Bell.* **194**, 245, 77-C9
- The Linear Polarization of Quasi-stellar Radio Sources at 3.71 and 11.1 Centimeters. *J. F. C. Wardle and P. P. Kronberg.* **194**, 249, 77-C14
- The Redshift and Composite Nature of AP Librae (PKS 1514-24). *M. J. Disney, B. A. Peterson, and A. W. Rodgers.* **194**, L79, 80-F4
- R Coronae Borealis Stars**
- Carbon and Eruptive Stars: Surface Enrichment of Lithium, Carbon, Nitrogen, and ^{13}C by Deep Mixing. *I. Juliana Sackmann, Richard L. Smith, and Keith H. Despain.* **187**, 555, 8-C5
- Spectroscopic Observations of Interesting Southern Stars Noted on Southern Objective-Prism Plates. *C. B. Stephenson.* **191**, 685, 47-G4
- RR Lyrae Stars**
- The Composition of RR Lyrae Stars. *A. W. Rogers.* **191**, 433, 44-D4
- The Calculation of Periodic Pulsations of Stellar Models. *R. F. Stellingwerf.* **192**, 139, 51-C5
- Radial Velocities**
- Catalog of Individual Radial Velocities, $12^{\text{h}}\text{--}24^{\text{h}}$, Measured by Astronomers of the Mount Wilson Observatory. *Helmut A. Abt.* **187**, 421, 6-A3; Suppl. **26**, 365 (No. 234)
- Remarks on the Magnitude-Redshift Bands in the Coma Clus-

- ter. *Jeno M. Barnothy and Madeleine F. Barnothy*. **189**, 11, 19-B1
- The Palomar Radial-Velocity Spectrometer. *R. F. Griffin and James E. Gunn*. **191**, 545, 45-D10
- Old Planetary Nebulae and the Relation between Size and Expansion Velocity. *Thomas J. Bohuski and Malcolm G. Smith*. **193**, 197, 65-A1
- A Study of an Early Flare, Radial Velocities, and Parallax Residuals for Possible Orbital Motion of HD 103095 (Groombridge 1830). *W. R. Beardsley, G. Gatewood, and K. W. Kamper*. **194**, 637, 83-A8
- Radiative Transfer**
- Monte Carlo Simulation of Voigt Distribution in Photon-Diffusion Problems. *Jong-Sen Lee*. **187**, 159, 2-E4
 - The Transfer of Circularly Polarized Radiation. *George W. Collins II and Paul F. Buerger*. **187**, 163, 2-E7
 - On the Passage of Radiation through Inhomogeneous, Moving Media. I. The Plane, Differentially Sheared Medium. *I. Lerche*. **187**, 589, 8-E11
 - On the Passage of Radiation through Inhomogeneous, Moving Media. II. The Rotating, Differentially Shearing Medium. *Ian Lerche*. **187**, 597, 8-F5
 - Radiative Transfer, Excitation, and Cooling of Molecular Emission Lines (CO and CS). *N. Z. Scoville and P. M. Solomon*. **187**, L67, 6-C5
 - Polarization by Rotationally Distorted Electron-Scattering Atmospheres. *Joseph P. Cassinelli and Bernhard M. Haisch*. **188**, 101, 11-A13
 - Complete Linearization of the Integral Equations in Radiative Transfer. *Wolfgang Kalkofen*. **188**, 105, 11-B3
 - Optical Thickness in the He I Singlet Spectrum of Nebulae. *R. R. Robbins and A. P. Bernat*. **188**, 309, 14-A2
 - On the Passage of Radiation through Inhomogeneous, Moving Media. III. The Steady-State Fields of Inertial Charge Distributions. *I. Lerche*. **188**, 627, 17-G3
 - Gravitational Stokes Parameters. *A. Marcello Anile and Reinhard A. Breuer*. **189**, 39, 19-D1
 - On the Use of Mean Escape Probabilities to Solve Transfer Problems in Nebulae. *A. P. Bernat and R. R. Robbins*. **189**, 459, 25-E11
 - Some Observational Implications of Extended Static O-Star Model Atmospheres. *Dimitri Mihalas and David G. Hummer*. **189**, L39, 21-B9
 - Monte Carlo Model of Reflection Nebulae: Intensity Gradients. *T. Roark, B. Roark, and G. W. Collins II*. **190**, 67, 28-F1
 - Formation of Coupled Spectral Lines in a Planetary Atmosphere. *J. W. Chamberlain and L. Wallace*. **190**, 487, 33-D7
 - Observed Departures from LTE in Stellar Fe I Lines. I. The Sun. *Myron A. Smith*. **190**, 481, 33-D1
 - Index of Refraction of Plasma in Motion. *Moshe Elitzur*. **190**, 673, 36-G4
 - A Nonlinear Model for the Intensity, Line Width, and Coherence of Astrophysical Masers. *Richard A. Rosen*. **190**, L73, 33-G11
 - Scattering in the Shell of Eta Carinae. *Eric R. Craine*. **191**, 105, 40-B1
 - The Stokes Parameters for Light Arising from Induced Processes. *G. C. Pomraning*. **191**, 183, 40-G1
 - On the Passage of Radiation through Inhomogeneous, Moving Media. IV. Radiative Transfer under Single-Particle Compton Scattering. *I. Lerche*. **191**, 191, 40-G8
 - Radiative Transfer of Partially Polarized Light. *C. Acquista and J. L. Anderson*. **191**, 567, 45-F2
 - On the Passage of Radiation through Inhomogeneous, Moving Media. V. Line Absorption and Frequency Variations of Optical Depth. *I. Lerche*. **191**, 753, 48-D13
 - On the Passage of Radiation through Inhomogeneous, Moving Media. VII. Concerning the Validity of the Geometrical Optics Approximation. *I. Lerche*. **191**, 763, 48-E8
 - Scintillation and Apparent Angular Diameter. *M. H. Cohen and W. M. Cronyn*. **192**, 193, 51-G3
 - Monte Carlo Simulation of Emission Frequencies from Partial Frequency Redistribution Functions. *Jong-Sen Lee*. **192**, 465, 56-C11
 - A New Formulation of an Approximate Transfer Equation. *Philippe Delache*. **192**, 475, 56-D6
 - Observed Departure from LTE in Stellar Fe I Lines. II. Arcturus. *Myron A. Smith*. **192**, 623, 59-D9
 - Resonance-Line Transfer with Partial Redistribution. II. The Solar Mg II Lines. *R. W. Milkey and Dimitri Mihalas*. **192**, 769, 60-G8
 - Solution of the Inhomogeneous Rayleigh Scattering Atmosphere. *M. J. Prather*. **192**, 787, 61-A13
 - Theory of Extended Stellar Atmospheres. I. Computational Method and First Results for Static Spherical Models. *Dimitri Mihalas and D. G. Hummer*. **193**, 503, 69-B1; Suppl. **28**, 343 (No. 265)
 - Transfer of Line Radiation in Differentially Expanding Atmospheres. IV. The Two-Level Atom in Plane-parallel Geometry Solved by the Feautrier Method. *Peter D. Noerdlinger and George B. Rybicki*. **193**, 651, 71-D5
 - Why $^{12}\text{C}^{16}\text{O}$ Profiles in Dark Clouds Do Not Have Flat Tops. *Andrew S. Milman*. **193**, L93, 69-E9
 - On the Passage of Radiation through Inhomogeneous, Moving Media. VIII. Ray Paths and Fluxes in a Plane Differentially Sheared Medium. *Martin A. Lee*. **194**, 165, 75-F6
 - On the Passage of Radiation through Inhomogeneous, Moving Media. X. Ray and Phase Paths in Arbitrary Velocity Fields. *I. Lerche*. **194**, 403, 79-A12
 - On the Passage of Radiation through Inhomogeneous, Moving Media. XI. Nonlinear Effects on Ray Paths in the Geometrical Optics Approximation. *M. A. Lee and I. Lerche*. **194**, 409, 79-B4
 - A Simplified Method for Calculation of Radiative Energy Loss Due to Spectral Lines. *Richard C. Canfield*. **194**, 483, 79-G3
 - Radiative Trapping and Population Inversions of the SiO Masters. *John Kwan and Nick Scoville*. **194**, L97, 80-G7
- Radio Lines**
- Carbon Recombination Lines and Interstellar Hydrogen Clouds. *A. K. Dupree*. **187**, 25, 1-B9
 - A Search for OD in the Galactic Center. *Mark Allen, Diego A. Cesarsky, and Richard M. Crutcher*. **188**, 33, 10-C5
 - The Structure of the Orion Nebula. I. Observations of the C 8 α Recombination Line. *B. Balick, R. H. Gammon, and L. H. Doherty*. **188**, 45, 10-D3
 - Is X-ogen HCO^+ ? *Eric Herbst and William Klemperer*. **188**, 255, 13-D6
 - $^{12}\text{C}/^{13}\text{C}$ Abundance Ratios from Observations of Interstellar $\text{H}_2^{13}\text{C}^{16}\text{O}$. *B. Zuckerman, D. Buhl, Patrick Palmer, and L. E. Snyder*. **189**, 217, 22-D7
 - Detection of Radio Recombination-Line Emission from the Rho Ophiuchi Dark Cloud. *Robert L. Brown and G. R. Knapp*. **189**, 253, 22-G3
 - OH Observations near the Reflection Nebulae NGC 2068 and NGC 2071. *L. E. B. Johansson, B. Höglund, A. Winnberg, Nguyen-Q-Rieu, and W. M. Goss*. **189**, 455, 25-E6
 - Detection of OH at 18-Centimeter Wavelength in Comet Kohoutek (1973f). *B. E. Turner*. **189**, L137, 27-E9
 - On Microwave Recombination Lines from H I Regions. *B. Zuckerman and John A. Ball*. **190**, 35, 28-C9
 - Vibrationally Excited Silicon Monoxide in the Orion Nebula. *J. H. Davis, G. N. Blair, H. Van Till, and P. Thaddeus*. **190**, L117, 37-F13
 - Radiative Relaxation of Hyperfine Populations. *John Kwan*. **191**, 101, 40-A12
 - Millimeter-Wavelength Molecular Lines and Far-Infrared Sources. *M. Morris, Patrick Palmer, B. E. Turner, and B. Zuckerman*. **191**, 349, 43-E4
 - High-Frequency Observations of Possible "Heavy-Element" Recombination Lines. *E. J. Chaisson*. **191**, 411, 44-B8
 - Large-Scale Wave Structure in the Orion Molecular Cloud. *T. G. Phillips, K. B. Jefferts, P. G. Wannier, and P. A. R. Ade*. **191**, L31, 42-C5

Radio Lines — Continued

- Radiofrequency Emission from CH in Comet Kohoutek (1973). *J. H. Black, E. J. Chaisson, J. A. Ball, H. Penfield, and A. E. Lilley.* **191**, L45, 42-D3
- Ultraviolet Fluorescent Pumping of OH 18-Centimeter Radiation in Comets. *Frederick H. Mies.* **191**, L145, 49-C13
- Some Properties of H₂CN⁺: A Potentially Important Interstellar Species. *Peter K. Pearson and Henry F. Schaefer III.* **192**, 33, 50-C1
- Maps of Spatial and Kinematic Structure of Galactic Nebulae. I. H 76α Studies of M17, M42, W51, and DR 21. *T. R. Gull and B. Balick.* **192**, 63, 50-E1
- Radio Recombination Lines at a Wavelength of 78 Centimeters. *Kurtiss J. Gordon, Courtney P. Gordon, and Felix J. Lockman.* **192**, 337, 55-A4
- The Nature and Distribution of Carbon Recombination-Line Emission in the Rho Ophiuchi Dark Cloud. *Robert L. Brown, R. H. Gammon, G. R. Knapp, and Bruce Balick.* **192**, 607, 59-C8
- The New Molecular Cloud in Orion. *M. Morris, B. Zuckerman, B. E. Turner, and Patrick Palmer.* **192**, L27, 53-B11
- Detection of the $J = 1 \rightarrow 0$ Rotational Transition of vibrationally Excited Silicon Monoxide. *P. Thaddeus, J. Mather, J. H. Davis, and G. N. Blair.* **192**, L33, 53-C3
- A New DCN Line: DCN(HCN) Excitation. *T. G. Phillips, K. B. Jefferts, and P. G. Wannier.* **192**, L153, 62-A5
- Detection of the 10.464-GHz Transition of Interstellar Thioformaldehyde. *L. H. Doherty, J. M. MacLeod, and T. Oka.* **192**, L157, 62-A9
- Sulfur in Southern H II Regions. *J. J. Danziger.* **193**, 69, 63-F2
- Recombination Lines in Planetary Nebulae at 15 Gigahertz. *R. C. Bignell.* **193**, 687, 71-G3
- U93.174: A New Interstellar Line with Quadrupole Hyperfine Splitting. *B. E. Turner.* **193**, L83, 69-E1
- Tentative Identification of U93.174 as the Molecular Ion N₂H⁺. *S. Green, J. A. Montgomery, Jr., and P. Thaddeus.* **193**, L89, 69-E6
- Why ¹²C¹⁶O Profiles in Dark Clouds Do Not Have Flat Tops. *Andrew S. Milman.* **193**, L93, 69-E9
- The Ethynyl Radical C₂H: A New Interstellar Molecule. *K. D. Tucker, M. L. Kutner, and P. Thaddeus.* **193**, L115, 72-F9
- A Search for Interstellar Nitroxyl (HNO). *N. Fourikis, M. W. Sinclair, R. D. Brown, J. G. Crofts, and P. D. Godfrey.* **194**, 41, 74-D8
- Effects of a Free-free Radio Continuum on the Populations of High Atomic Levels at Low Temperatures and Densities. *I. A. Ahmad.* **194**, 503, 80-B5
- Radio Radiation**
- A Search for Isolated Radiofrequency Pulses. *G. R. Huguenin and E. L. Moore.* **187**, L57, 6-B9
- Molecular Clouds in the Galactic Nucleus. *N. Z. Scoville, P. M. Solomon, and K. B. Jefferts.* **187**, L63, 6-C1
- Inverse Compton Radiation and the Magnetic Field in Clusters of Galaxies. *D. E. Harris and W. Romanishin.* **188**, 209, 13-A3
- Confusion and Flux-Density Error Distributions. *J. J. Condon.* **188**, 279, 13-F1
- Radio Emission from Pre-Main-Sequence Stars. *John H. Spencer and Philip R. Schwartz.* **188**, L105, 18-E1
- On the Recombination-Line Observations toward Supernova 3C 391. *E. J. Chaisson.* **189**, 69, 19-F3
- Early Evolution of Radio Outbursts and a Possible Transient Emission of High-Energy Photons. *F. Pacini and M. Salvati.* **188**, L55, 15-E9
- Dust and Gas in the Orion Molecular Cloud: Observations of 1-Millimeter Continuum and 2-Centimeter H₂CO Emission. *P. M. Harvey, I. Gatley, M. W. Werner, J. H. Elias, N. J. Evans II, B. Zuckerman, G. Morris, T. Sato, and M. M. Liwak.* **189**, L87, 24-F13
- Polarization of Inverse Plasmon Scattering. *R. A. Windsor and P. J. Kellogg.* **190**, 167, 29-E14
- The Absence of Radio Emission from HZ Herculis. *Lee Hartmann and Alan S. Lapedes.* **190**, L67, 33-G5
- Radio-Continuum Measurements of Planetary Nebulae at 15.5 GHz. *Gopal Sistla, G. Kojoian, and E. J. Chaisson.* **192**, 165, 51-E1
- Infrared, Radio, and X-Ray Observations of Cygnus X-3. *E. E. Becklin, F. J. Hawkins, K. O. Mason, K. Matthews, G. Neugebauer, D. Packman, P. W. Sanford, B. Schupler, A. Stark, and C. G. Wynn-Williams.* **192**, L119, 61-E11
- The Crab Nebula Pulsar: Radiofrequency Spectral Variability. *John M. Rankin, R. R. Payne, and D. B. Campbell.* **193**, L71, 69-D2
- An Experimental Test of the Homogeneity of the Interstellar Medium. *P. L. Baker.* **194**, 271, 77-E8
- Radio Observations of the Infrared Source AFCRL 809-2992. *Robert L. Brown.* **194**, L9, 76-C11
- Four-Stokes-Parameter Radiofrequency Polarimetry of a Flare from AD Leonis. *Steven R. Spangler, John M. Rankin, and Stanley D. Shawhan.* **194**, L43, 76-F2
- Radio Radiation, Planetary**
- The Microwave Properties of Saturn's Rings. *F. H. Briggs.* **189**, 367, 24-A10
- The Nature of the Subsurface of Mercury from Microwave Observations at Several Wavelengths. *Jeffrey N. Cuzzi.* **189**, 577, 26-G1
- Implications of the Pioneer 10 Measurements of the Jovian Magnetic Field for Theories of Io-modulated Decametric Radiation. *Robert A. Smith and C. S. Wu.* **190**, L91, 34-A13
- The Position and Stokes Parameters of the Integrated 21-Centimeter Radio Emission of Jupiter and their Variation with Epoch and Central Meridian Longitude. *Glenn L. Berge.* **191**, 775, 48-F5
- Jupiter Emission Observed near 1 MHz. *Larry W. Brown.* **192**, 547, 57-B8
- Interpretation of Saturn's Decimetric Radio Emission. *J. J. Condon, M. J. Yerbury, and D. L. Jauncey.* **193**, 257, 65-E1
- Dekametric and Hectometric Observations of Jupiter from the RAE-1 Satellite. *Michael D. Desch and Thomas D. Carr.* **194**, L57, 76-G1
- Spectral Behavior of Jupiter near 1 MHz. *Larry W. Brown.* **194**, L159, 84-G4
- Radio Radiation, Solar**
- Solar Cosmic-Ray Acceleration by a Plasma Instability. *S. Peter Gray.* **187**, 195, 2-G6
- Limits to Solar Limb Darkening at a Wavelength of 1.4 Millimeters Derived from Antenna-Beam Parameters. *P. A. R. Ade, J. D. G. Rather, and P. E. Clegg.* **187**, 389, 5-E13
- Stabilization of Electron Streams in Type III Solar Radio Bursts. *Konstantinos Papadopoulos, Melvyn L. Goldstein, and Robert A. Smith.* **190**, 175, 29-F7
- The Small-Scale, Quasi-periodic, Disk Component of Solar Radio Radiation. *Kenneth R. Lang.* **192**, 777, 61-A2
- Radio Sources**
- Scorpius X-1: Origin of the Radio and Hard X-Ray Emissions. *R. Ramaty, C. C. Cheng, and S. Tsuruta.* **187**, 61, 1-E3
- Southern Radio Sources Possibly Identified with X-Ray Sources. *N. Sanduleak and J. F. Dolan.* **187**, L73, 6-C10
- A High-Resolution Map of the Galactic-Center Region. *J. E. Kapitzky and W. A. Dent.* **188**, 27, 10-B13
- Spectra of Some Ohio Radio Sources: List IV (Erratum). *B. H. Andrew, J. R. Ehman, M. R. Gearhart, and J. D. Kraus.* **189**, 165, 20-E12
- Radio Synthesis Observations of Planetary Nebulae. *Yervant Terzian, Bruce Balick, and Carl Bignell.* **188**, 257, 13-D8
- Confusion and Flux-Density Error Distributions. *J. J. Condon.* **188**, 279, 13-F1
- The Polarization of Normal Galaxies at Radio Wavelengths. *J. F. C. Wardle and R. A. Sramek.* **189**, 399, 25-A4
- The Correlation of Radio Emission and Optical Type with X-Ray Emission from Clusters of Galaxies. *Frazer N. Owen.* **189**, L55, 24-D11
- A Blue Galactic Nucleus with a Featureless Spectrum. *E. Ye. Khachikian and D. W. Weedman.* **189**, L99, 27-C1

- The Photometric History of the Object Identified with PKS 0537-441. *Wm. Liller.* 189, L101, 27-C3
- The Gravitational Slingshot and the Structure of Extragalactic Radio Sources. *William C. Saslaw, Mauri J. Valtonen, and Sverre J. Aarseth.* 190, 253, 31-A13
- Spectroscopy of Objects near Texas Radio-Source Positions. *D. Wills and Beverley J. Wills.* 190, 271, 31-C3
- Spectroscopic Observations of Objects Identified with Radio Sources. *P. A. Strittmatter, R. F. Carswell, G. Gilbert, and E. M. Burbidge.* 190, 509, 35-A4
- Observation of Enhanced Soft X-Ray Emission from the Vicinity of the North Polar Spur. *P. A. J. de Korte, J. A. M. Bleeker, A. J. M. Deerenberg, Y. Tanaka, and K. Yamashita.* 190, L5, 30-D7
- 3C 66A: A Bright New Quasi-stellar Object. *Beverley J. Wills and D. Wills.* 190, L97, 37-E6
- On the Systematic Optical Identification of the Remaining 3C Radio Sources. I. A Search in 47 Fields. *Jerome Kristian, Allan Sandage, and Basil Karem.* 191, 43, 39-C12
- Turnover Radio Spectra of Elliptical Galaxies. *Thomas W. Noonan.* 191, 301, 43-A14
- Observations of Galactic Carbon Monoxide Emission at 2.6 Millimeters. *W. J. Wilson, P. R. Schwartz, E. E. Epstein, W. A. Johnson, R. D. Etcheverry, T. T. Mori, G. G. Berry, and H. B. Dyson.* 191, 357, 43-E11
- Radio Emission from Markarian 6. *R. A. Sramek and H. M. Tovmassian.* 191, 633, 47-C11
- A Study of the H I Absorption in the Galaxy M82 by Radio Interferometry. *L. Welniachew.* 191, 639, 47-D2
- Limits on Ionized Intracluster Gas in Abell 2199. *Arthur Davidsson and William Welch.* 191, L11, 42-A11
- Markarian 348: A Variable Radio Source. *R. A. Sramek and H. M. Tovmassian.* 191, L13, 42-A13
- Physics of Compact Nonthermal Sources. II. Determination of Physical Parameters. *T. W. Jones, S. L. O'Dell, and W. A. Stein.* 192, 261, 54-B8
- Radio Fine Structure in the Galactic Center. *Bruce Balick and Robert H. Sanders.* 192, 325, 54-G4
- Compact Radio Structure in the H II Region G351.6-1.3. *J. J. Broderick and Robert L. Brown.* 192, 343, 55-A10
- Polarization of Radio Sources. V. Absorption Effects on Circular Repolarization in Compact Sources. *A. G. Pacholczyk and T. L. Swihart.* 192, 591, 59-B8
- VLB Observations of the Crab Nebula and the Wavelength Dependence of Interstellar Scattering. *R. L. Mutel, J. J. Broderick, T. D. Carr, M. Lynch, M. Desch, W. W. Warnock, and W. K. Klempner.* 193, 279, 65-F9
- Observations at Wavelengths of 2.2 and 4.5 Centimeters of the Linear Polarization of Radio Galaxies and Quasars. *Jacques P. Vallee and Philipp P. Kronberg.* 193, 303, 67-A13
- Observations of H₂CO in the Direction of Cassiopeia A. *T. H. Troland and Carl Heiles.* 194, 43, 74-D10
- The Linear Polarization of Quasi-stellar Radio Sources at 3.71 and 11.1 Centimeters. *J. F. C. Wardle and P. P. Kronberg.* 194, 249, 77-C14
- Intense Sub-Arcsecond Structure in the Galactic Center. *Bruce Balick and Robert L. Brown.* 194, 265, 77-E1
- Fine Structure in H II Regions. II. *B. E. Turner, Bruce Balick, D. D. Cudaback, Carl Heiles, and Robert J. Boyle.* 194, 279, 77-F1
- The Gamma Cygni Supernova Remnant and Nebula. *Hugh M. Johnson.* 194, 337, 78-C11
- The Nature of Cygnus X-3 Radio Outbursts from an Analysis of Radiofrequency Spectra. *P. C. Gregory and E. R. Seaquist.* 194, 715, 83-G1
- Optical and Infrared Observations of the Jet of M87. *T. D. Kinman, G. L. Grasdalen, and G. H. Rieke.* 194, L1, 76-C2
- Radio Sources, Variable**
- The Evolution of the Radio Spectrum of Cassiopeia A. *W. A. Dent, H. D. Aller, and E. T. Olsen.* 188, L11, 12-C12
 - Further Observations of Apparent Changes in the Structure of 3C 273 and 3C 279. *K. J. Kellermann, B. G. Clark, D. B. Shaffer, M. H. Cohen, D. L. Jauncey, J. J. Broderick, and A. E. Niell.* 189, L19, 21-A3
 - Optical Observations of the Radio Source 0735+178. *R. F. Carswell, P. A. Strittmatter, R. E. Williams, T. D. Kinman, and K. Serkowski.* 190, L101, 37-E11
 - Short-Duration Radio Flares of UV Ceti Stars. *Steven R. Spangler, Stanley D. Shawhan, and John M. Rankin.* 190, L129, 37-G9
 - BL Lacertae (VRO 42.22.01): Simultaneous Radio and Optical Observations. *B. H. Andrew, G. A. Harvey, W. J. Medd, K. R. Hackney, R. L. Hackney, R. L. Scott, A. G. Smith, R. J. Leacock, B. Q. McGimsey, E. E. Epstein, J. W. Montgomery, J. Mottmann, and R. B. Pompfrey.* 191, 51, 39-E1
 - NGC 1068: Possible 3-Millimeter Radio Variability. *William G. Fogarty, Eugene E. Epstein, and John Mottmann.* 191, 305, 43-B4
 - Daily Observations of Cygnus X-3 at 10.5 GHz during the Period 1973 July–October. *V. A. Hughes, A. Woodsworth, P. C. Gregory, and E. R. Seaquist.* 191, 749, 48-D10
 - The Significance of Radio Flux Variations in PKS 0735+178. *T. W. Jones.* 191, L15, 42-B1
 - On the Short-Timescale Variability of OJ 287. *Alan L. Kiplinger.* 191, L109, 49-A9
 - A Model for the Radio Bursts of Cygnus X-3. *K. A. Marsh, C. R. Purton, and P. A. Feldman.* 192, 697, 60-B9
 - A Search for Additional Radio Sources in the Kukarkin Variable Star Catalog. *David B. Shaffer and Gregory A. Shields.* 192, L83, 57-G1
 - Correlated Optical and Infrared Behavior of OJ 287 and Similar Radio Sources. *G. H. Rieke and T. D. Kinman.* 192, L115, 61-E8
 - The Rapidly Variable Radio Source 3C 120. *G. A. Seielstad.* 193, 55, 63-E2
 - Some Problems with the Radio Source Cygnus X-3. *R. M. Hellming, R. L. Brown, and L. C. Blankenship.* 194, L13, 76-D1
 - Detection of a Strong and Possibly Variable Compact Millimeter Wave Component in Centaurus A. *K. J. Kellermann.* 194, L135, 84-E8
- Redshifts**
- Spectroscopic Observations of NGC 4676. *Alan Stockton.* 187, 219, 4-A8
 - The Definition, Visibility, and Significance of Redshift-Magnitude Bands. *W. G. Tifft.* 188, 221, 13-A14
 - The Hubble Relation for Nonstandard Candles and the Origin of the Redshift of Quasars. *Vahé Petrosian.* 188, 443, 16-A3
 - Empirical Properties of the Mass Discrepancy in Groups and Clusters of Galaxies. II. *Herbert J. Rood.* 188, 451, 16-A10
 - Remarks on the Magnitude-Redshift Bands in the Coma Cluster. *Jeno M. Barnothy and Madeleine F. Barnothy.* 189, 11, 19-B1
 - A Distance Limit for NGC 7318B in Stephan's Quintet. *G. S. Shostak.* 189, L1, 20-G1
 - The Distance of BL Lacertae. *J. B. Oke and J. E. Gunn.* 189, L5, 20-G4
 - Spectroscopy of Objects near Texas Radio-Source Positions. *D. Wills and Beverley J. Wills.* 190, 271, 31-C3
 - Spectroscopic Observations of Objects Identified with Radio Sources. *P. A. Strittmatter, R. F. Carswell, G. Gilbert, and E. M. Burbidge.* 190, 509, 35-A4
 - Steps toward the Hubble Constant. I. Calibration of the Linear Sizes of Extragalactic H II Regions. *Allan Sandage and G. A. Tammann.* 190, 525, 35-B4
 - Optical Observations of the Radio Source 0735+178. *R. F. Carswell, P. A. Strittmatter, R. E. Williams, T. D. Kinman, and K. Serkowski.* 190, L101, 37-E11
 - The Interpretation of Broad Emission Lines in High-Redshift QSOs. *Ronald E. Stoner, Roger Ptak, and David Ellis.* 191, 291, 43-A4
 - The Significance of Radio Flux Variations in PKS 0735+178. *T. W. Jones.* 191, L15, 42-B1

Redshifts — Continued

- Interpretation of Redshifts of Galaxies in Clusters. *E. R. Harrison.* **191**, L51, 46-A8
- A Search for Primeval Galaxies at High Redshifts. *R. B. Partridge.* **192**, 241, 54-A4
- Tidal Effects as Criteria for Membership in Small Groups of Galaxies: Application to VV 166. *John Kormendy and Wallace L. W. Sargent.* **193**, 19, 63-B9
- Optical Spectra and Redshifts of 4C Quasi-stellar Radio Sources. *Maarten Schmidt.* **193**, 505, 70-A4
- On the Nature of Faint Blue Objects in High Galactic Latitudes. III. A Spectroscopic Search for Quasars in Four Survey Fields. *Maarten Schmidt.* **193**, 509, 70-A7
- An Analysis of the Spectrum of the Large-Redshift Quasi-stellar Object OQ 172. *J. A. Baldwin, E. M. Burbidge, G. R. Burbidge, C. Hazard, L. B. Robinson, and E. J. Wampler.* **193**, 513, 70-A11
- Chance Coincidences in the Absorption-Line Spectrum of 4C 05.34. *Y. P. Varshni.* **193**, L5, 66-A6
- Quasar-Cluster Association as a Test of the Cosmological or Local Hypothesis. *M. B. Bell.* **194**, 245, 77-C9
- Steps toward the Hubble Constant. IV. Distances to 39 Galaxies in the General Field Leading to a Calibration of the Galaxy Luminosity Classes and a First Hint of the Value of *Ho*. *Allan Sandage and G. A. Tammann.* **194**, 559, 82-B5
- The Redshift and Composite Nature of AP Librae (PKS 1514-24). *M. J. Disney, B. A. Peterson, and A. W. Rodgers.* **194**, L79, 80-F4
- Direct Electronographic Observations of Luminous Connections between Galaxies with Discordant Redshifts. *Merle F. Walker, C. D. Pike, and J. D. McGee.* **194**, L125, 84-D8
- Relativity**
- A Time-symmetric, Matter, Antimatter, Tachyon Cosmology. *J. Richard Gott III.* **187**, 1, 1-A3
- Relativistic Terms in Nonlinear Pulsation Theory. *Cecil G. Davis.* **187**, 175, 2-F4
- The Effect of Gravitational Radiation-Reaction on the Evolution of the Riemann S-Type Ellipsoids. *Bonnie D. Miller.* **187**, 609, 8-G2
- A Case of Metastability for Slowly Rotating, Supermassive Objects. *Helena Dedic and Jean-Louis Tassoul.* **188**, 173, 11-F11
- Physics of Compact Nonthermal Sources. I. Theory of Radiation Processes. *T. W. Jones, S. L. O'Dell, and W. A. Stein.* **188**, 353, 14-D2
- Anisotropic Spheres in General Relativity. *Richard L. Bowers and E. P. T. Liang.* **188**, 657, 18-B3
- Gravitational Stokes Parameters. *A. Marcello Anile and Reinhard Breuer.* **189**, 39, 19-D1
- Solar Neutrinos and the Behavior of the Fermi Coupling Constant. *Arrigo Finzi.* **189**, 157, 20-E5
- Observations in Locally Inhomogeneous Cosmological Models. *C. C. Dyer and R. C. Roeder.* **189**, 167, 22-A4
- On Gravitational-Lens Quasars. *L. N. K. de Silva.* **189**, 177, 22-A13
- Relativistic Stellar Stability: Preferred-Frame Effects. *Wei-Tou Ni.* **190**, 131, 29-C8
- On the Stability of Axisymmetric Systems to Axisymmetric Perturbations in General Relativity. V. Differentially Rotating Configurations. *Clifford M. Will.* **190**, 403, 32-E8
- The Space-Time of Axisymmetric Gravitating Masses. *K. Y. Fu.* **190**, 411, 32-F2
- The Oblateness of the Sun. *R. H. Dicke and H. Mark Goldberg.* **190**, 507, 33-E9; Suppl. **27**, 131 (No. 241)
- Perturbation of a Slowly Rotating Black Hole by a Stationary Axisymmetric Ring of Matter. I. Equilibrium Configurations. *Clifford M. Will.* **191**, 521, 45-C2
- Electron-Ion Relaxation in a Dense Plasma. *J. E. Littleton and J.-R. Buchler.* **191**, 731, 48-C5
- Analytic Pulsar Models. *Richard C. Adams, Jeffrey M. Cohen, Ronald J. Adler, and Charles Sheffield.* **192**, 525, 57-A1
- Relativistic Ejection of a Particle by Radiation Pressure. II. *Peter D. Noerdlinger.* **192**, 529, 57-A5
- The Deformed Figures of the Dedekind Ellipsoids in the Post-Newtonian Approximation to General Relativity. *S. Chandrasekhar and Donna D. Elbert.* **192**, 731, 60-E1
- Can a Neutron Star Be Compressed into a Black Hole? *A. E. Hwang and John J. Dykla.* **192**, L141, 61-G8
- Perturbations of a Rotating Black Hole. III. Interaction of the Hole with Gravitational and Electromagnetic Radiation. *Saul A. Teukolsky and William H. Press.* **193**, 443, 68-D12
- On the Passage of Radiation through Inhomogeneous, Moving Media. XI. Nonlinear Effects on Ray Paths in the Geometrical Optics Approximation. *M. A. Lee and I. Lerche.* **194**, 409, 79-B4
- Thermodynamic Stability of Relativistic Rotating Stellar Configurations and a Maximum Principle for the Entropy. *J. Katz and G. Horwitz.* **194**, 439, 79-D3
- Rotation**
- On a Criterion for the Onset of Dynamical Instability by a Nonaxisymmetric Mode of Oscillation along a Sequence of Differentially Rotating Configurations. *S. Chandrasekhar.* **187**, 169, 2-E12
- "Lorentz Force-free" Pulsar Rotating Fields. *V. G. Endean.* **187**, 359, 5-C14
- Rotating Magnetosphere: Far Field Solutions. *F. Curtis Michel.* **187**, 585, 8-E7
- The Effect of Gravitational Radiation-Reaction on the Evolution of the Riemann S-Type Ellipsoids. *Bonnie D. Miller.* **187**, 609, 8-G2
- Accretion onto Black Holes: The Emergent Radiation Spectrum. III. Rotating (Kerr) Black Holes. *Stuart L. Shapiro.* **189**, 343, 23-F12
- The Fission Theory of Binary Stars. II. Stability to Third-Harmonics Disturbances. *N. R. Lebovitz.* **190**, 121, 29-B12
- On the Stability of Axisymmetric Systems to Axisymmetric Perturbations in General Relativity. V. Differentially Rotating Configurations. *Clifford M. Will.* **190**, 403, 32-E8
- Toroidal Figures of Equilibrium. *Cheuk-Yin Wong.* **190**, 675, 36-G6
- Variations of the Emission Line Profiles in the O6ef Star Lambda Cephei. *Peter S. Conti and Stewart A. Frost.* **190**, L137, 38-A1
- Disk-Accretion onto a Black Hole. II. Evolution of the Hole. *Kip S. Thorne.* **191**, 507, 45-B3
- Perturbation of a Slowly Rotating Black Hole by a Stationary Axisymmetric Ring of Matter. I. Equilibrium Configurations. *Clifford M. Will.* **191**, 521, 45-C2
- Roche Limit of a Solid Body. *H. R. Aggarwal and V. R. Oberbeck.* **191**, 577, 45-F12
- Analytic Pulsar Models. *Richard C. Adams, Jeffrey M. Cohen, Ronald J. Adler, and Charles Sheffield.* **192**, 525, 57-A1
- On the Axisymmetric Pulsar Atmosphere. *Satoshi Hinata and E. Atlee Jackson.* **192**, 703, 60-C1
- The Deformed Figures of the Dedekind Ellipsoids in the Post-Newtonian Approximation to General Relativity. *S. Chandrasekhar and Donna D. Elbert.* **192**, 731, 60-E1
- Perturbations of a Rotating Black Hole. III. Interaction of the Hole with Gravitational and Electromagnetic Radiation. *Saul A. Teukolsky and William H. Press.* **193**, 443, 68-D12
- Thermodynamic Stability of Relativistic Rotating Stellar Configurations and a Maximum Principle for the Entropy. *J. Katz and G. Horwitz.* **194**, 439, 79-D3
- Rotation, Solar**
- Faculae and the Solar Oblateness. II. *R. H. Dicke.* **190**, 187, 29-G4
- On the Sun's Differential Rotation: Its Maintenance by Large Scale Meridional Motions in the Convection Zone. *Bernard R. Durney.* **190**, 211, 30-A14
- The Differential Rotation of the Solar Surface. *Peter J. Gierasch.* **190**, 199, 30-A2
- The Oblateness of the Sun. *R. H. Dicke and H. Mark Goldberg.* **190**, 507, 33-E9; Suppl. **27**, 131 (No. 241)
- Rigid and Differential Rotation Driven by Oscillations within

- the Sun. *Charles L. Wolff*. 194, 489, 80-A2
- Rotation, Stellar**
- Rotational Distortion of Stellar Absorption Lines. I. Parameters from Photographic Spectra. *Thomas R. Stoeckley and Charles S. Morris*. 188, 579, 17-C6
 - The Effects of Rapid, Differential Rotation on the Spectra of White Dwarfs. *Robert L. Milton*. 189, 543, 26-D9
 - Dynamical Phases of Rotating Supermassive Stars. *Klaus J. Fricke*. 189, 535, 26-D1
 - Rotating Superfluid in Neutron Stars. *M. A. Ruderman and P. G. Sutherland*. 190, 137, 29-C14
 - Pulsar Magnetic Axis Alignment and Counteralignment. *William W. Macy, Jr.* 190, 153, 29-E1
 - On the Inclination of Rotation Axes in Visual Binaries. *Edward W. Weis*. 190, 331, 31-G8
 - On the Electrodynamic Equilibrium of a Space Charge Region around a Rotating Neutron Star with an Aligned Magnetic Field. *Werner G. Philipp*. 190, 391, 32-D11
 - Photoelectric Profile Measurement of H α and H β in Be Stars. *David F. Gray and J. M. Marlborough*. 190, 505, 33-E7; Suppl. 27, 121 (No. 240)
 - Calculation of Theoretical Rotational Line Profiles for the Determination of $v \sin i$ in the Spectral Range O9-F8. *George W. Collins II*. 191, 157, 40-E3
 - Energy Limits on the Penrose Process. *Robert M. Wald*. 191, 231, 41-C2
 - An Exact Study of Rigidly and Rapidly Rotating Stars in General Relativity with Application to the Crab Pulsar. *Silvano Bonazzola and Jean Schneider*. 191, 273, 41-F2
 - Influence of Rotation on the Maximum Mass of Pulsationally Stable Stars. *Richard Stothers*. 192, 145, 51-C11
 - Further Observations of Stars in the Intermediate-Age Open Cluster NGC 2477. *F. D. A. Hartwick and James E. Hesser*. 192, 391, 55-E7
 - Rotational Velocities of A0 Stars. *Michael M. Dworetsky*. 192, 574, 57-D6; Suppl. 28, 101 (No. 256)
 - Ultraviolet Television Data from the Orbiting Astronomical Observatory. II. Stellar Ultraviolet Colors and Interstellar Extinction. *Eric Peytremann and Robert J. Davis*. 192, 815, 61-C12; Suppl. 28, 211 (No. 260)
 - Pulsar Near Fields. *Jeffrey L. Parish*. 193, 225, 65-B13
 - Production of Magnetic Fields in the Interiors of Stars and Several Effects on Stellar Evolution. *E. H. Levy and W. K. Rose*. 193, 419, 68-C3
 - Distinctive Patterns on the Surface of Slowly Rotating Stars Whose Oscillations Are Nonlinearly Coupled. *Charles L. Wolff*. 193, 721, 72-B7
 - The Manganese Stars. *Sidney C. Wolff and Richard J. Wolff*. 194, 65, 74-F3
 - Nonlinear, Adiabatic, Nonradial Stellar Pulsation: Calculations and Applications. 194, 393, 79-A3
 - The Gap in the Two-Color Diagram of Main-Sequence Stars. *E. Böhm-Vitense and R. Canterra*. 194, 629, 83-A1
 - The Apsidal-Motion Test for Models of Main-Sequence Stars. *Richard Stothers*. 194, 651, 83-B11
 - Violation of the Vogt-Russell Theorem for Homogeneous Non-degenerate Stars. *Richard Stothers*. 194, 699, 83-E12
 - On the Solution of Poisson's Equation for Rapidly Rotating Stars. *Maurice J. Clement*. 194, 709, 83-F8
 - The Structure of Synchronously Rotating Close Binaries Built on Polytropic Model $\nu = 3$. *Louis C. Green and Eleanor K. Kolchin*. 194, 757, 84-B12; Suppl. 28, 449 (No. 271)
- S-Type Stars**
- Studies of Evolved Stars. IV. Band Strength Ratios as Indicators of Mixing in M, MS, and S Stars. *John M. Scalo*. 194, 361, 78-E12
- Satellites**
- High-Resolution Spectra of Sodium Emission from Io. *Robert A. Brown and Frederic H. Chaffee, Jr.* 187, L125, 9-F1
 - Sodium Emission from Io: Implications. *Michael B. McElroy*, *Yuk Ling Yung, and Robert A. Brown*. 187, L127, 9-F3
 - Sodium Emission from Io: Implications. *Michael B. McElroy, Yuk Ling Yung, and Robert A. Brown*. 187, L127, 9-F3
 - 12-Micron Emission Features of the Galilean Satellites and Ceres. *Olav L. Hansen*. 188, L31, 12-E2
 - Infrared Observations of Phobos from Mariner 9. *I. Gatley, H. Kieffer, E. Miner, and G. Neugebauer*. 190, 497, 33-E2
 - The Spatial Extent of Sodium Emission around Io. *L. Trafton, T. Parkinson, and W. Macy, Jr.* 190, L85, 34-A8
 - Implications of the Pioneer 10 Measurements of the Jovian Magnetic Field for Theories of Io-modulated Decametric Radiation. *Robert A. Smith and C. S. Wu*. 190, L91, 34-A13
 - Infrared Photometry of Titan. *F. J. Low and G. H. Rieke*. 190, L143, 38-A7
 - Roche Limit of a Solid Body. *H. R. Aggarwal and V. R. Oberbeck*. 191, 577, 45-F12
 - Sodium D-Line Emission from Io: Sputtering and Resonant Scattering Hypothesis. *Dennis L. Matson, Torrence V. Johnson, and Fraser P. Fanale*. 192, L43, 53-D1
 - The Source of Neptune's Internal Heat and the Value of Neptune's Tidal Dissipation Factor. *L. Trafton*. 193, 477, 68-G5
 - Spectroscopic Observations of Io. *Yu. Mekler and A. Eviatar*. 193, L151, 73-B5
 - New Evidence for the Variability of Titan. *M. Noland, J. Veverka, and J. Goguen*. 194, L157, 84-G2
- Saturn**
- The 7.5- to 13.5-Micron Spectrum of Saturn. *F. C. Gillett and W. J. Forrest*. 187, L37, 3-D6
 - The Microwave Properties of Saturn's Rings. *F. H. Briggs*. 189, 367, 24-A10
 - Infrared Photometry of Titan. *F. J. Low and G. H. Rieke*. 190, L143, 38-A7
 - Interpretation of Saturn's Decimetric Radio Emission. *J. J. Condon, M. J. Yerbury, and D. L. Jauncey*. 193, 257, 65-E1
 - New Evidence for the Variability of Titan. *M. Noland, J. Veverka, and J. Goguen*. 194, L157, 84-G2
- Seyfert Galaxies**
- Observations of the Infrared Radiation from the Nuclei of NGC 1068 and NGC 4151. *W. A. Stein, F. C. Gillett, and K. M. Merrill*. 187, 213, 4-A3
 - On the Nuclear Motions in NGC 4151. *Kurt S. Anderson*. 187, 445, 7-B10
 - Infrared Spectrum of NGC 1068. *R. F. Jameson, A. J. Longmore, J. A. McLinn, and N. J. Woolf*. 187, L109, 9-E2
 - On the Steady Flow of Gas from the Nuclei of Seyfert Galaxies. *Arthur M. Wolfe*. 188, 243, 13-C8; Addendum, 188, 441, 15-C14
 - Radiative Acceleration of Gas Clouds near Quasi-stellar Objects and Seyfert Galaxy Nuclei. *William G. Mathews*. 189, 23, 19-B12
 - On Gravitational-Lens Quasars. *L. N. K. de Silva*. 189, 177, 22-A13
 - The Southern Seyfert Galaxies NGC 1566 and NGC 3783. *Patrick S. Osmer, Malcolm G. Smith, and Daniel W. Weedman*. 189, 187, 22-B8
 - The Absorption-Line Spectrum of NGC 4151. *Kurt S. Anderson*. 189, 195, 22-C2
 - A Blue Galactic Nucleus with a Featureless Spectrum. *E. Ye. Khachikian and D. W. Weedman*. 189, L99, 27-C1
 - Infrared Emission by Dust in NGC 1068 and Three Planetary Nebulae. *R. F. Jameson, A. J. Longmore, J. A. McLinn, and N. J. Woolf*. 190, 353, 32-B2
 - NGC 1068: Possible 3-Millimeter Radio Variability. *William G. Fogarty, Eugene E. Epstein, and John Mottmann*. 191, 305, 43-B4
 - X-Ray Ionization and the Helium Abundance in 3C 120. *G. A. Shields*. 191, 309, 43-B8
 - Radio Emission from Markarian 6. *R. A. Sramek and H. M. Tovmassian*. 191, 633, 47-C11
 - Markarian 348: A Variable Radio Source. *R. A. Sramek and H. M. Tovmassian*. 191, L13, 42-A13
 - 10-Micron Observations of Southern-Hemisphere Galaxies. *D.*

- Seyfert Galaxies — Continued**
- E. Kleinmann and E. L. Wright.* 191, L19, 42-B5
 - An Atlas of Seyfert Galaxies. *Edward Ye. Khachikian and Daniel W. Weedman.* 192, 581, 59-A7
 - Effect of Inelastic Electron-Atom Collisions on the Balmer Decrement. *W. M. Adams and Vahé Petrosian.* 192, 199, 51-G8
 - On the Variability of the Compact Nonthermal Sources. *James L. Elliot and Stuart L. Shapiro.* 192, L3, 53-A4
 - Infrared Polarization of NGC 1068. *R. F. Knacke and R. W. Capps.* 192, L19, 53-B4
 - On QSO and Seyfert Galaxy Line-Emission Models. *Gordon M. MacAlpine.* 193, 37, 63-C12
- Shock Waves**
- The Formation of Deuterium and the Light Elements by Spallation in Supernova-Shocks. *Stirling A. Colgate.* 187, 321, 5-A4
 - X-Ray Emission from an Inward-propagating Shock in Young Supernova Remnants. *Christopher F. McKee.* 188, 335, 14-B13
 - Numerical Models of the Evolution of Supernova Remnants: The Shell-Formation Stage. *W. C. Straka.* 190, 59, 28-E5
 - The Doppler Splitting of Spectral Lines in Pulsating Stars. *Angelo James Skalafuris.* 190, 91, 28-G10
 - Electron-Ion Relaxation in a Dense Plasma. *J. E. Littleton and J.-R. Buchler.* 191, 731, 48-C5
 - The Structure of an H I-H II Boundary. *A. K. Macpherson.* 192, 369, 55-C11
 - Dissipation in Supernova Shock Waves. *T. A. Weaver and G. F. Chapline.* 192, L57, 57-E6
 - The Structure and Stability of Shock Waves in a Multiple Interstellar Medium. *Stuart L. Mufson.* 193, 561, 70-E2
 - The Impossibility of Plasma Radiation from Electron Plasma Wave Turbulence within Collisionless Shock Waves. *Dean F. Smith and N. A. Krall.* 194, L163, 84-G8
- Short-Period Variables**
- The Photometric History of the Object Identified with PKS 0537-441. *Wm. Liller.* 189, L101, 27-C3
- Solar Activity**
- The Spatial Distribution of Lyman- α on the Sun. *D. K. Prinz.* 187, 369, 5-D9
 - Evidence of Solar-Cycle Variations in the Solar Wind. *D. S. Intriligator.* 188, L23, 12-D8
 - Acceleration of Thermal Particles in Collapsing Magnetic Regions. *Randolph H. Levine.* 190, 447, 33-A11
 - Research with Solar Satellites. *Leo Goldberg.* 191, 1, 39-A4
 - The Dynamical Properties of Twisted Ropes of Magnetic Field and the Vigor of New Active Regions on the Sun. *E. N. Parker.* 191, 245, 41-D1
 - Deuterium, Tritium, and Helium-3 Production in Solar Flares. *R. Ramaty and B. Kozlovsky.* 193, 729, 72-C1
- Solar Atmospheric Motions**
- An Explanation of the Solar Limb Shift. *Michael H. Hart.* 187, 393, 5-F4
 - Direct Observation of Temperature Amplitude of Solar 300-Second Oscillations. *H. S. Hudson and C. A. Lindsey.* 187, L35, 3-D4
 - Dynamics of the Solar Magnetic Field. III. Location of Solar-Flare Excitation and the Velocity Field Determined from Magnetograms. *Randolph H. Levine and Y. Nakagawa.* 190, 703, 37-B6
 - Dynamics of the Solar Magnetic Field. IV. Examples of Force-free Magnetic-Field Evolution in Response to Photospheric Motions. *Y. Nakagawa and K. Tanaka.* 190, 711, 37-B13
 - The Small-Scale, Quasi-periodic, Disk Component of Solar Radio Radiation. *Kenneth R. Lang.* 192, 777, 61-A2
 - Distinctive Patterns on the Surface of Slowly Rotating Stars Whose Oscillations Are Nonlinearly Coupled. *Charles L. Wolff.* 193, 721, 72-B7
 - Evidence for Large-Scale Oscillations of the Solar Photosphere. *Eric Fossat, Gilbert Ricort, Claude Aime, and François Roddier.* 193, L97, 69-E13
 - Rigid and Differential Rotation Driven by Oscillations within the Sun. *Charles L. Wolff.* 194, 489, 80-A2
- Analysis of the Solar Magnesium I Spectrum. *Richard C. Alcock and Richard C. Canfield.* 194, 733, 84-A3
- Solar Spectra**
- Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount. *E. M. Reeves, P. V. Foukal, M. C. E. Huber, R. W. Noyes, E. J. Schmahl, J. G. Timothy, J. E. Vernazza, and G. L. Withbroe.* 188, L27, 12-D11
- Solar System**
- Interstellar Molecules: Origin by Catalytic Reactions on Grain Surfaces? *Edward Anders, Ryoichi Hayatsu, and Martin H. Studier.* 192, L101, 58-A5
- Solar Wind**
- Interpretation of Columnar Content Measurements of the Solar-Wind Turbulence. *Philip S. Callahan.* 187, 185, 2-F12
 - Comment on "Galactic Magnetic Fields: Cellular or Filamentary Structure?" *E. N. Parker.* 187, 191, 2-G4
 - Observations of He I 584 Å Nighttime Radiation: Evidence for an Interstellar Source of Neutral Helium. *Francesco Paresce, Stuart Bowyer, and Shailendra Kumar.* 187, 633, 9-A12
 - The Outer Solar Corona as Observed from *Skylab*: Preliminary Results. *R. M. MacQueen, J. A. Eddy, J. T. Gosling, E. Hildner, R. H. Munro, G. A. Newkirk, Jr., A. I. Poland, and C. L. Ross.* 187, L85, 6-D7
 - Evidence of Solar-Cycle Variations in the Solar Wind. *D. S. Intriligator.* 188, L23, 12-D8
 - Acceleration of the Solar Wind by the Interplanetary Magnetic Field. *Aaron Barnes.* 188, 645, 18-A6
 - An Interpretation of the Observed Oxygen and Nitrogen Enhancements in Low-Energy Cosmic Rays. *L. A. Fisk, B. Kozlovsky, and R. Ramaty.* 190, L35, 30-F14
 - Anomalies in the Composition of Interplanetary Heavy Ions with $0.01 < E < 40$ MeV per amu. *J. H. Chan and P. B. Price.* 190, L39, 30-G3
 - Energetic Electrons in Jupiter's Magnetosphere. *F. V. Coroniti.* 191, 287, 41-G1; Suppl. 27, 261 (No. 24)
 - On the Nature of the Asymptotically Adiabatic Solution of the Two-Fluid Solar Wind. *Ian W. Roxburgh.* 191, 557, 45-E8
 - Sweet's Mechanism in the Solar Wind. *L. F. Burlaga and J. D. Scudder.* 191, L149, 49-D3
 - Monte Carlo Analysis of the Solar-Wind Modulation of Galactic C-N-O at Solar Maximum. *T. A. Moss and R. T. Giulii.* 192, 753, 60-F8
 - Magnetoacoustic Instability and Termination of Solar Wind. *B. Buti.* 192, 757, 60-F11
 - Observations of Helium in the Interplanetary/Interstellar Wind: The Solar-Wake Effect. *C. S. Weller and R. R. Meier.* 193, 471, 68-F13
 - The Interstellar Wake of the Solar Wind. *G. Yu.* 194, 187, 75-G13
- Spectra, Infrared**
- Infrared Spectra of γ^1 Velorum and ζ Puppis. *T. G. Barnes, D. L. Lambert, and A. E. Potter.* 187, 73, 1-F1
 - Formation of the Luminosity-sensitive O I Multiplet at 7774 Å. *H. R. Johnson, R. W. Milkey, and L. W. Ramsey.* 187, 147, 2-D7
 - A New Upper Limit for an Atmosphere of CO₂, CO on Mercury. *Uwe Fink, Harold P. Larson, and Richard F. Poppen.* 187, 407, 5-G2
 - High-Resolution Spectra of Cool Stars in the 10- and 20-Micron Regions. *Richard Treffers and Martin Cohen.* 188, 545, 17-A1
 - Spectral Classification from Infrared Spectra of Moderate Dispersion. *Henry Albers.* 189, 463, 25-F1
 - Observations of the Profile of the Ca II Infrared Triplet Line $\lambda\lambda 8498$ in Late-Type Stars. *Christopher M. Anderson.* 190, 585, 35-G6
 - High-Resolution Fourier Spectra of Stars and Planets. *Pierre Connes and Guy Michel.* 190, L29, 30-F5
 - The Fundamental Rotation-Vibration Band of TiO. *John G. Phillips.* 191, 597, 46-A4; Suppl. 27, 319 (No. 247)

- Infrared Observations of BD-10°4662. *John A. Hackwell, Bernard W. Bopp, and Robert D. Gehrz.* 192, L79, 57-F11
- Evidence for an Internal Heat Source in Neptune. *Robert E. Murphy and Laurence M. Trafton.* 193, 253, 65-D12
- Silicon Carbide: Its Ground State and Predicted Spectrum. *Barry L. Lutz and James A. Ryan.* 194, 753, 84-B8
- Spectra, Laboratory**
- Laser-Plasma Spectra of Highly Ionized Fluorine. *U. Feldman, G. A. Doschek, D. J. Nagel, W. E. Behring, and R. D. Cowan.* 187, 417, 5-G11
- Autoionization Spectra of Beryllium (Be I and Be II) in the 110- to 140-eV Energy Range. *G. Mehlman and J. M. Esteva.* 188, 191, 12-A1
- Transitions $2s^2 2p^k - 2s^2 2p^{k+1}$ of the F I, O I, and N I Isoelectronic Sequences. *G. A. Doschek, U. Feldman, R. D. Cowan, and Leonard Cohen.* 188, 417, 15-B1
- Hook-Method Measurements of gf-Values for Ultraviolet Fe I and Fe II Lines on a Shock Tube. *Martin C. E. Huber.* 190, 237, 30-C10
- Solar-Flare and Laboratory Plasma Phenomena. *Tong Nyong Lee.* 190, 467, 33-C3
- Satellite Line Spectra from Laser-produced Plasmas. *U. Feldman, G. A. Doschek, D. J. Nagel, R. D. Cowan, and R. R. Whitlock.* 192, 213, 52-A6
- Arc Measurements of Fe I Oscillator Strengths. *J. M. Bridges and R. L. Kornblith.* 192, 793, 61-B5
- Oscillator Strengths in the TiO Alpha-Band System. *A. R. Fairbairn, S. J. Wolnik, and R. O. Berthel.* 193, 273, 65-F3
- Autoionization Spectra of Magnesium (Mg I, Mg II, and Mg III) in the 50- to 110-eV Energy Range. *J. M. Esteva and G. Mehlman.* 193, 747, 72-D7
- Spectra, Molecular**
- Reinvestigation of Rotational-Line Intensity Factors in Diatomic Spectra. *Ellis E. Whiting and Ralph W. Nicholls.* 187, 661, 9-C10; Suppl. 27, 1 (No. 235)
- Jupiter: Identification of Ethane and Acetylene. *S. T. Ridgway.* 187, L41, 3-D9
- Detection of ^{17}O in IRC+10216. *D. M. Rank, T. R. Geballe, and E. R. Wollman.* 187, L111, 9-E3
- A New Analysis of the $\Delta^2\text{A}-X^2\Pi$ System of CH. *Brian M. Krupp.* 189, 389, 24-C5
- Detection of Possible Maser Emission near 3.48 Millimeters from an Unidentified Molecular Species in Orion. *L. E. Snyder and D. Buhl.* 189, L31, 21-B1
- A New Source of Intense Molecular Emission in the Rho Ophiuchi Complex. *P. J. Encrenaz.* 189, L135, 27-E7
- Laboratory Microwave Spectrum of Ethylene Oxide. *Chiaki Hirose.* 189, L145, 27-F1
- Identification of H_2O^+ in the Tail of Comet Kohoutek (1973). *P. A. Wehinger, S. Wyckoff, G. H. Herbig, G. Herzberg, and H. Lew.* 190, L43, 30-G6
- Electronic Transitions of the LaO Molecule. *L. Schoonveld and S. Sundaram.* 191, 288, 41-G2; Suppl. 27, 307 (No. 246)
- The Fundamental Rotation-Vibration Band of TiO. *John G. Phillips.* 191, 597, 46-A4; Suppl. 27, 319 (No. 247)
- Some Properties of H_2CN^+ : A Potentially Important Interstellar Species. *Peter K. Pearson and Henry F. Schaefer III.* 192, 33, 50-C1
- Cometary Comet Ions. *A. C. Aikin.* 192, 263, 65-E7
- Jupiter: Identification of Ethane and Acetylene (Erratum). *S. T. Ridgway.* 192, L51, 53-D8
- Small Silicon Molecules: Possible Sources of the Unidentified Molecular Lines U81.5, U86.2, U89.2, and U90.7. *Frank J. Lovas.* 193, 265, 65-E9
- Oscillator Strengths in the TiO Alpha-Band System. *A. R. Fairbairn, S. J. Wolnik, and R. O. Berthel.* 193, 273, 65-F3
- Silicon Carbide: Its Ground State and Predicted Spectrum. *Barry L. Lutz and James A. Ryan.* 194, 753, 84-B8
- Spectra, Optical**
- On Detecting Cold, Low-Density Interstellar Gas. *Jon C. Weisheit.* 190, L121, 37-G2
- Spectra, Planetary**
- A New Upper Limit for an Atmosphere of CO₂, CO on Mercury. *Uwe Fink, Harold P. Larson, and Richard F. Poppen.* 187, 407, 5-G2
- On the Identification of the 6420 Å Absorption Feature in the Spectra of Uranus and Neptune. *Tobias Owen, Barry L. Lutz, Carolyn C. Porco, and Jerry H. Woodman.* 189, 379, 24-B10
- The Search for HD in the Spectrum of Uranus: An Upper Limit to [D/H]. *Barry L. Lutz and Tobias Owen.* 190, 731, 37-D3
- The Spatial Extent of Sodium Emission around Io. *L. Trafton, T. Parkinson, and W. Macy, Jr.* 190, L85, 34-A8
- The Visible Spectrum of Uranus. *R. E. Danielson.* 192, L107, 58-A10
- Sulfur Acid Cloud Interpretation of the Infrared Spectrum of Venus. *John V. Martonchik.* 193, 495, 69-A8
- Spectra, Radio**
- The Structure of the Orion Nebula. I. Observations of the C 85α Recombination Line. *B. Balick, R. H. Gammon, and L. H. Doherty.* 188, 45, 10-D3
- Pulsar Flux-Density Spectra. *D. C. Backer and J. R. Fisher.* 189, 137, 20-D1
- Spectra of Some Ohio Radio Sources: List IV (Erratum). *B. H. Andrew, J. R. Ehman, M. R. Gearhart, and J. D. Kraus.* 189, 165, 20-E12
- The V1057 Cygni OH Source: Time Variation, Polarization Properties, and Accurate Position. *K. Y. Lo and Kenneth P. Bechis.* 190, L125, 37-G5
- Turnover Radio Spectra of Elliptical Galaxies. *Thomas W. Noonan.* 191, 301, 43-A14
- Radio Emission from Markarian 6. *R. A. Sramek and H. M. Tovmassian.* 191, 633, 47-C11
- The Nature of Cygnus X-3 Radio Outbursts from an Analysis of Radiofrequency Spectra. *P. C. Gregory and E. R. Seaquist.* 194, 715, 83-G1
- Radiofrequency Spectra. *P. C. Gregory and E. R. Seaquist.* 194, 715, 83-G1
- Spectra, Solar**
- Theoretical Analysis of the Al I Absorption Spectrum. *C. D. Lin.* 187, 385, 5-E10
- An Explanation of the Solar Limb Shift. *Michael H. Hart.* 187, 393, 5-F4
- Direct Observational Evidence for the Propagation and Dissipation of Energy in the Chromosphere. *Sou-Yang Liu.* 189, 359, 24-A1
- The Widths of the Solar He I and He II Lines at 584, 537, and 304 Å. *G. A. Doschek, W. E. Behring, and U. Feldman.* 190, L141, 38-A5
- Solar-Flare Emission Lines in the Range from 66 to 171 Å: $2s^2 2p^k - 2s^2 2p^{k+1}$ Transitions in Highly Ionized Iron. *S. O. Kastner, W. M. Neupert, and M. Swartz.* 191, 261, 41-E3
- Ultraviolet Fluorescent Pumping of OH 18-Centimeter Radiation in Comets. *Frederick H. Mies.* 191, L145, 49-C13
- Resonance-Line Transfer with Partial Redistribution. II. The Solar Mg II Lines. *R. W. Milkey and Dimitri Mihalas.* 192, 769, 60-G8
- Relative Coronal Abundances Derived from X-Ray Observations. III. The Effect of Cascades on the Relative Intensity of Fe XVII Line Fluxes, and a Revised Iron Abundance. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss.* 194, 471, 79-F5
- Analysis of the Solar Magnesium I Spectrum. *Richard C. Altrock and Richard C. Canfield.* 194, 733, 84-A3
- Spectra, Ultraviolet**
- Theoretical Analysis of the Al I Absorption Spectrum. *C. D. Lin.* 187, 385, 5-E10
- Observations of He I 584 Å Nighttime Radiation: Evidence for an Interstellar Source of Neutral Helium. *Francesco Paresce, Stuart Bowyer, and Shailendra Kumar.* 187, 633, 9-A12
- Two New Physical Processes in the Far-Ultraviolet Spectrum of Zeta Tauri. *Sara R. Heap and Theodore P. Stecher.* 187, L27, 3-C10

Spectra, Ultraviolet — Continued

- A Broad Absorption Region in the Ultraviolet Spectra of Early-Type Stars. *G. I. Thompson, C. M. Humphries, and K. Nandy.* **187**, L81, 6-D3
- Autoionization Spectra of Beryllium (Be I and Be II) in the 110- to 140-eV Energy Range. *G. Mehlman and J. M. Esteva.* **188**, 191, 12-A1
- Transitions $2s^2 2p^k - 2s 2p^{k+1}$ of the F I, O I, and N I Isoelectronic Sequences. *G. A. Doschek, U. Feldman, R. D. Cowan, and Leonard Cohen.* **188**, 417, 15-B1
- A Search for Lyman-Alpha Emission in Beta Lyrae from *Copernicus*. *Yoji Kondo and George E. McCluskey.* **188**, L63, 15-F2
- High-Spectral-Resolution Measurements of the H I $\lambda\lambda 1216$ and Mg II $\lambda 2800$ Emissions from Arcturus. *H. W. Moos, J. L. Linsky, R. C. Henry, and W. McClintock.* **188**, L93, 18-D5
- Hook-Method Measurements of gf-Values for Ultraviolet Fe I and Fe II Lines on a Shock Tube. *Martin C. E. Huber.* **190**, 237, 30-C10
- Complex Infrared Emission Features in the Spectrum of Beta Lyrae. *T. H. Morgan, A. E. Potter, and Y. Kondo.* **190**, 349, 32-A12
- Interstellar Lines in the Ultraviolet Spectrum of Delta Scorpii. *Andrew M. Smith.* **190**, 565, 35-F2
- Solar-Flare Emission Lines in the Range from 66 to 171 Å: $2s^2 2p^k - 2s^2 2p^{k+1}$ Transitions in Highly Ionized Iron. *S. O. Kastner, W. M. Neupert, and M. Swartz.* **191**, 261, 41-E3
- The Ultraviolet Spectrum of Eta Canis Majoris, B5 Ia. *Anne B. Underhill.* **191**, 601, 46-A6; Suppl. **27**, 359 (No. 249)
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XVI. The Stellar Lyman-Alpha Absorption Line. *Blair D. Savage and Robert J. Panek.* **191**, 659, 47-E5
- Autoionization Spectra of Magnesium (Mg I, Mg II, and Mg III) in the 50- to 110-eV Energy Range. *J. M. Esteva and G. Mehlman.* **193**, 747, 72-D7
- Rocket-Ultraviolet Spectra of Kappa, Lambda, Tau, and Upsilon Scorpii. *Edward B. Jenkins, Donald C. Morton, and Donald G. York.* **194**, 77, 74-G1
- Spectra, X-Ray**
- Extended Observations of >7-keV X-Rays from Centaurus X-3 by the OSO-7 Satellite. *W. A. Baity, M. P. Ulmer, W. A. Wheaton, and L. E. Peterson.* **187**, 341, 5-B9
- A Theoretical and Experimental Study of Fe xix to Fe xxiv Solar-Flare Spectra and Isoelectronic Spectra in Sulfur. *B. C. Fawcett, R. D. Cowan, and R. W. Hayes.* **187**, 377, 5-E3
- Laser-Plasma Spectra of Highly Ionized Fluorine. *U. Feldman, G. A. Doschek, D. J. Nagel, W. E. Behring, and R. D. Cowan.* **187**, 417, 5-G11
- The Spectra of S XIII and S XIV in the Region 25–40 Å. *S. Goldsmith, L. Oren, and Leonard Cohen.* **188**, 197, 12-A9
- Relative Coronal Abundances Derived from X-Ray Observations. I. Sodium, Magnesium, Aluminum, Silicon, Sulfur, and Argon. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss.* **188**, 423, 15-B9
- Long-Term Observations of Cygnus X-2 from OSO-7. *M. P. Ulmer, A. Sammuli, W. A. Baity, Wm. A. Wheaton, and L. E. Peterson.* **189**, 339, 23-F9
- An Unusual X-Ray Source in Scutum. *R. Hill, G. Burginyon, R. Grader, A. Toor, J. Stoering, and F. Seward.* **189**, L69, 24-E9
- Observation of X-Ray Emission from M31. *Stuart Bowyer, Bruce Margon, Michael Lampton, and Ray Crudace.* **190**, 285, 31-D5
- The Spectrum of Diffuse Cosmic X-Rays Observed by OSO-3 between 7 and 100 keV. *Daniel A. Schwartz and Laurence E. Peterson.* **190**, 297, 31-E3
- Relative Coronal Abundances Derived from X-Ray Observations. II. Nitrogen, Oxygen, Neon, Magnesium, and Iron. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss.* **192**, 169, 51-E5
- Satellite Line Spectra from Laser-produced Plasmas. *U. Feldman, G. A. Doschek, D. J. Nagel, R. D. Cowan, and R. R. Whitlock.* **192**, 213, 52-A6
- Observations of the 4.8-Hour Variations of Cygnus X-3 above 7 keV from the OSO-7. *M. P. Ulmer, W. A. Baity, Wm. A. Wheaton, and L. E. Peterson.* **192**, 691, 60-B4
- Spectral Classification**
- Some Morphological Properties of WN Spectra. *Nolan R. Walborn.* **189**, 269, 23-A11
- Spectral Classification from Infrared Spectra of Moderate Dispersion. *Henry Albers.* **189**, 463, 25-F1
- Spectroscopic Observations of Interesting Southern Stars Noted on Southern Objective-Prism Plates. *C. B. Stephenson.* **191**, 685, 47-G4
- Spectral Types of M Dwarf Stars. *Alfred H. Joy and Helmut A. Abt.* **192**, 237, 52-C1; Suppl. **28**, 1 (No. 252)
- Spectroscopic Observations of O-Type Stars. V. The Hydrogen Lines and $\lambda 4686$ He II. *Peter S. Conti and Eva M. Leep.* **193**, 113, 64-B2
- Revised Catalog of Spectra of Mira Variables of Types Me and Se. *Philip C. Keenan, Robert F. Garrison, and Armin J. Deutsch.* **193**, 289, 65-G5; Suppl. **28**, 271 (No. 262)
- The Manganese Stars. *Sidney C. Wolff and Richard J. Wolff.* **194**, 65, 74-F3
- The Subgiant CH Stars. *Howard E. Bond.* **194**, 95, 75-A5
- Visual and Infrared Observations of Late-Type Supergiants in the Southern Sky. *R. M. Humphreys and E. P. Ney.* **194**, 623, 82-G8
- Spectroheliograms**
- The Spatial Distribution of Lyman- α on the Sun. *D. K. Prinz.* **187**, 369, 5-D9
- On Spatial Variations in the Intensity of Chromospheric H α . *K. B. Gebbie and R. Steinitz.* **188**, 399, 14-G6
- Research with Solar Satellites. *Leo Goldberg.* **191**, 1, 39-A4
- Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount. *P. V. Foukal, M. C. E. Huber, R. W. Noyes, E. M. Reeves, E. J. Schmahl, J. G. Timothy, J. E. Vernazza, and G. L. Withbroe.* **193**, L143, 73-A10
- Spectrophotometry**
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIII. The Albedos of Jupiter, Uranus, and Neptune. *Blair D. Savage and John J. Caldwell.* **187**, 197, 2-G8
- A Note on the Use of the Strength of the Si II Doublet $\lambda\lambda 6347, 6371$ as a Luminosity Indicator in B9-A2 Supergiants. *Jeffrey D. Rosenthal.* **187**, 261, 4-D4
- Spectroscopic Studies of O-Type Stars. IV. Lines in the Red Region. *Peter S. Conti.* **187**, 539, 8-D4
- On the Problem of V1016 Cygni and the Evolutionary Stage of the Symbiotic Stars. *G. B. Baratta, A. Cassatella, and R. Viotti.* **187**, 651, 9-C1
- Detection of Interstellar Lithium in the Direction of 55 Cygni. *Paul A. Vanden Bout and Gerald Grupsmith.* **187**, L9, 3-B8
- Free-free and Free-bound Emission in Low-Surface-Gravity Stars. *Robert C. Gilman.* **188**, 87, 10-G13
- Absolute Spectral Energy Distributions for White Dwarfs. *J. B. Oke.* **188**, 443, 15-C13; Suppl. **27**, 21 (No. 236)
- Photoelectric Spectrophotometry of the Cygnus Loop. *Joseph S. Miller.* **189**, 239, 22-F1
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. X. Nova FH Serpentis 1970. *John S. Gallagher III and Arthur D. Code.* **189**, 303, 23-D1
- The Distance of BL Lacertae. *J. B. Oke and J. E. Gunn.* **189**, L5, 20-G4
- Spectrophotometric Observations of a Highly Absorbed Object in Cygnus. *K. M. Merrill and B. T. Soifer.* **189**, L27, 21-A11
- Photoelectric Spectrophotometry of OQ 172 and OH 471. *J. B. Oke.* **189**, L47, 24-D5
- A New List of 52 Degenerate Stars. VII. *Jesse L. Greenstein.* **189**, L131, 27-E4
- Strong-Line K Stars. I. Photometry. *Valdar Oinas.* **192**, 233, 52-B13; Suppl. **27**, 391 (No. 250)
- Strong-Line K Stars. II. Chemical Abundances. *Valdar Oinas.*

- 192**, 233, 52-B13; Suppl. **27**, 405 (No. 250)
- Comparison of the Optical Spectrum of the Filaments with the Spectrum of the Central Region of M82. *Natarajan Visvanathan*. **192**, 319, 54-F11
- Ultraviolet Spectrophotometry of Sirius from Gemini I2. *G. G. Spear, Y. Kondo, and K. G. Henize*. **192**, 615, 59-D2
- Spectral Energy Distributions of Standard Stars of Intermediate Brightness. I. *Remington P. S. Stone*. **193**, 135, 64-C10
- The Continuous Spectrum of Herbig-Haro Objects. *K.-H. Böhm, R. D. Schwartz, and W. A. Siegmund*. **193**, 353, 67-E4
- Spectrophotometry of the Crab Nebula. *Robert P. Kirshner*. **194**, 323, 78-B12
- Spectrum Variables**
- The Variations of the Magnetic Ap Star 49 Camelopardalis. *Walter K. Bonsack, Catherine A. Pilachowski, and Sidney C. Wolff*. **187**, 265, 4-D7
- OAO-2 Observations of the Helium Spectrum Variable a Centauri. *Michael R. Molnar*. **187**, 531, 8-A11
- Short-Term Spectral Variability of γ^2 Velorum. Photometric Observations. *A. Sanyal, W. Weller, and S. Jeffers*. **187**, L31, 3-D1
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XV. The Strongly Magnetic Variable HD 215441. *David S. Leckrone*. **190**, 319, 31-F10
- Variations of the Emission Line Profiles in the O6ef Star Lambda Cephei. *Peter S. Conti and Stewart A. Frost*. **190**, L137, 38-A1
- A New Phenomenon in the Spectrum of Sigma Orionis E. *Nolan R. Walborn*. **191**, L95, 46-D9
- On the Variability of the Compact Nonthermal Sources. *James L. Elliot and Stuart L. Shapiro*. **192**, L3, 53-A4
- High-Dispersion Spectroscopy of the Sigma Orionis System. *C. T. Bolton*. **192**, L7, 53-A9
- A Search for Neutral Iron Lines in a Centauri. *John Norris and Bodo Baschek*. **193**, 133, 64-C8
- Star Formation**
- Spectroscopic Observations of NGC 4676. *Alan Stockton*. **187**, 219, 4-A8
- Sensitivity of the Star Formation Rate to the Interstellar Gas Abundance of Heavy Elements. *Raymond J. Talbot Jr.*. **189**, 209, 22-C14
- Gas Density and the Rate of Star Formation in M33. *Barry F. Madore, Sidney van den Bergh, and David H. Rogstad*. **191**, 317, 43-C2
- Millimeter-Wavelength Molecular Lines and Far-Infrared Sources. *M. Morris, Patrick Palmer, B. E. Turner, and B. Zuckerman*. **191**, 349, 43-E4
- Photometric Properties of Model Spherical Galaxies. *Richard B. Larson and Beatrice M. Tinsley*. **192**, 293, 54-D11
- Stars, Individual** (arranged by Constellation name, HD number, and other designation)
- By Constellation Name
- Short-Period Radial-Velocity Variations in π Aquarii. *Adela E. Ringuelet and Marcos E. Machado*. **189**, 285, 23-B12
- Interpretation of Epsilon Aurigae. II. Infrared Excess, Secondary Light Variations, and Plausible Formation of a Planetary System. *Su-Shu Huang*. **187**, 87, 1-G6
- Interpretation of Epsilon Aurigae. III. Study of the Light Curve Based on Disk Models. *Su-Shu Huang*. **189**, 485, 25-G10
- Orbital Elements and Absolute Dimensions of the Eclipsing System LY Aurigae. *George E. McCluskey, Jr., and Yoji Kondo*. **187**, 93, 1-G12
- Calcium II K Emission in RT Aurigae. *D. R. Hollars*. **194**, 137, 75-D3
- [α Bootis] Observed Departures from LTE in Stellar Fe I Lines. II. Arcturus. *Myron A. Smith*. **192**, 623, 59-D9
- The Variations of the Magnetic Ap Star 49 Camelopardalis. *Walter K. Bonsack, Catherine A. Pilachowski, and Sidney C. Wolff*. **187**, 265, 4-D7
- Rapid Light Variations of YZ Cancri: An Unusual SS Cygni **192**, 233, 52-B13; Suppl. **27**, 405 (No. 250)
- Star. *Thomas J. Moffett and Thomas G. Barnes III*. **194**, 141, 75-D6
- [α Canis Majoris] A Line-blanketed Model Stellar Atmosphere of Sirius. *John W. Fowler*. **188**, 295, 13-G3
- [α Canis Majoris] Ultraviolet Spectrophotometry of Sirius from Gemini I2. *G. G. Spear, Y. Kondo, and K. G. Henize*. **192**, 615, 59-D2
- The Ultraviolet Spectrum of Eta Canis Majoris, B5 Ia. *Anne B. Underhill*. **191**, 601, 46-A6; Suppl. **27**, 359 (No. 249)
- VY Canis Majoris. IV. The Emission Bands of ScO. *G. H. Herbig*. **188**, 533, 16-G4
- [α Canis Minoris] Stellar Model Chromospheres. II. Procyon (F5 IV-V). *Thomas R. Ayres, Jeffrey L. Linsky, and Richard A. Shine*. **192**, 93, 50-G7
- Rediscussion of Eclipsing Binaries. X. The B Stars AG Persei and CW Cassiopeiae. *Daniel M. Popper*. **188**, 559, 17-B3
- OAO-2 Observations of the Helium Spectrum Variable a Centauri. *Michael R. Molnar*. **187**, 531, 8-A11
- A Search for Neutral Iron Lines in a Centauri. *John Norris and Bodo Baschek*. **193**, 133, 64-C8
- The Age of Alpha Centauri. *Ann Merchant Boesgaard and Wendy Hagen*. **189**, 85, 19-G4
- Spectroscopic Studies of a Suggested Optical Candidate for Centaurus X-3. *N. V. Vidal, D. T. Wickramasinghe, B. A. Peterson, and M. S. Bessell*. **191**, L23, 42-B11
- [R Coronae Borealis] Supergiant Binary Stars. *Roberta M. Humphreys and E. P. Ney*. **187**, L75, 6-C12
- The Mass of the Dwarf Nova EM Cygni. *Edward L. Robinson*. **193**, 191, 64-G10
- Ultraviolet Detection of the Dwarf Nova SS Cygni. *Albert V. Holm and John S. Gallagher III*. **192**, 425, 56-A1
- V1016 Cygni: Spectral Observations 1969-1973. *M. Pim FitzGerald and Andrea Pilavski*. **192**, 575, 57-D7; Suppl. **28**, 147 (No. 258)
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XI. The 1971 Eclipse of 32 Cygni. *L. R. Doherty, J. F. McNall, and A. V. Holm*. **187**, 521, 8-A1
- A Model Envelope for the Shell Star 1 Delphini. *J. M. Marlborough and A. P. Cowley*. **187**, 99, 2-A4
- Nova Delphini 1967. I. Spectroscopic Observations. *A. Sanyal*. **192**, 574, 57-D6; Suppl. **28**, 115 (No. 257)
- Rapid Line Variability. I. The Ap Stars Epsilon Ursae Majoris and 73 Draconis. *Michel Breger*. **192**, 71, 50-E14
- The Extraordinarily Slow Magnetic Variation of Gamma Equulei. *Walter K. Bonsack and Catherine Pilachowski*. **190**, 327, 31-G4
- Selected Line Identifications in the Ultraviolet Spectrum of Gamma Equulei. *Saul J. Adelman*. **190**, 743, 37-E1; Suppl. **27**, 183 (No. 242)
- The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. III. Alpha Tauri, Beta Geminorum, and Mu Leonis. *J. Tomkin and D. L. Lambert*. **193**, 631, 71-C1
- Period Variation of the Cepheid Zeta Geminorum. *Helmut A. Abt and Saul G. Levy*. **188**, L75, 15-F11
- A Spectroscopic Study of YY Geminorum. *Bernard W. Bopp*. **193**, 389, 67-G11
- A Lower Limit on the $^{12}\text{C}/^{13}\text{C}$ Ratio in Alpha Herculis. *Rodger I. Thompson and Harold L. Johnson*. **193**, 147, 64-D8
- Spectroscopic Observations of HZ Herculis. *David Crampton*. **187**, 345, 5-B13
- Do Cosmic Rays Heat HZ Herculis? *K. Brecher and P. Morrison*. **187**, 349, 5-C5
- A Determination of the Cooling Time and the Speed of the Surface Currents of HZ Herculis. *Richard E. Dahab*. **187**, 351, 5-C7
- [HZ Herculis] A Slaved Disk Model for Hercules X-1. *Wm. James Roberts*. **187**, 575, 8-D11
- [HZ Herculis] A Ten-Day Observation of Hercules X-1 from the OSO-7 Satellite. *J. E. McClintock, G. W. Clark, W. H. G. Lewin, H. W. Schnopper, C. R. Canizares, and G. F. Sprott*. **188**, 159, 11-E9

Stars, Individual — Continued

- The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis. Steven A. Grandi, Paul M. N. O. Hintzen, Eric B. Jensen, Anthony E. Rydgren, John S. Scott, Philip M. Stickney, John A. J. Whelan, and Simon P. Worden. **190**, 365, 32-C1
- Optical Properties of HZ Herculis. *J. N. Bahcall, P. C. Joss, and Y. Avni.* **191**, 211, 41-A11
- A Spectroscopic Analysis of HZ Herculis. *David Crampton and J. B. Hutchings.* **191**, 483, 44-G7
- Optical Pulsations from the HZ Herculis-Hercules X-1 System. *Edward J. Groth.* **192**, 517, 56-G6
- Numerical Study of X-Ray Induced Mass Transfer in the HZ Herculis/Hercules X-1 Binary System. *Marvin L. Alme and James R. Wilson.* **194**, 147, 75-E1
- [Nova Herculis] The 71-Second Variation of DQ Herculis. *William Herbst, James E. Hesser, and Jeremiah P. Ostriker.* **193**, 679, 71-F9
- The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. III. Alpha Tauri, Beta Geminorum, and Mu Leonis. *J. Tomkin and D. L. Lambert.* **193**, 631, 71-C1
- The Abundance of Boron and Beryllium in Alpha Lyrae. *Ann Merchant Boesgaard, Françoise Praderie, David S. Leckrone, R. Faraggiana, and M. Hack.* **194**, L143, 84-F1
- The Secondary Component of Beta Lyrae. *Robert E. Wilson.* **189**, 319, 23-E4
- Complex Infrared Emission Features in the Spectrum of Beta Lyrae. *T. H. Morgan, A. E. Potter, and Y. Kondo.* **190**, 349, 32-A12
- Emission Lines in the Spectrum of Zeta Ophiuchi. *Virpi S. Niemelä and Roberto H. Méndez.* **187**, L23, 3-C5
- The Recent Shell Event of Zeta Ophiuchi. *Nelson J. Irvine.* **188**, L19, 12-D4
- Oscillator Strengths for Neutral Sodium and the Interstellar Sodium Abundance in Zeta Ophiuchi. *Peter Erman, J. Brzozowski, and Wm. Hayden Smith.* **192**, 59, 50-D11
- Weak Interstellar Lines in the Visible Spectrum of Zeta Ophiuchi. *S. Shulman, V. J. Bortolot, and P. Thaddeus.* **193**, 97, 64-A1
- Parallax, Orbit, and Mass of the Binary Star 70 Ophiuchi. *Michael D. Worth and Wulf D. Heintz.* **193**, 647, 71-D1
- The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. II. CN and CO in Alpha Orionis. *D. L. Lambert, D. S. Dearborn, and C. Sneden.* **193**, 621, 71-B4
- The Evolution of the Helium Star Sigma Orionis E. *Andrew P. Odell.* **194**, 645, 83-B6
- The $^{12}\text{C}/^{13}\text{C}$ Ratio in the Atmosphere of the K2 Supergiant Epsilon Pegasi. *David L. Lambert and Jocelyn Tomkin.* **194**, L89, 80-G1
- Rediscussion of Eclipsing Binaries. X. The B Stars AG Persei and CW Cassiopeiae. *Daniel M. Popper.* **188**, 559, 17-B3
- Infrared Spectra of γ^2 Velorum and ζ Puppis. *T. G. Barnes, D. L. Lambert, and A. E. Potter.* **187**, 73, 1-F1
- New High-Dispersion Radial-Velocity Curves of W Sagittarii. *Theodor S. Jacobsen.* **191**, 691, 47-G8
- [Upsilon Sagittarii] Supergiant Binary Stars. *Roberta M. Humphreys and E. P. Ney.* **187**, L75, 6-C12
- FG Sagittae: The *s*-Process Episode. *G. E. Langer, Robert P. Kraft, and Kurt S. Anderson.* **189**, 509, 26-B5
- An Interpretation of the Puzzling Observations of FG Sagittae. *I.-Juliana Christy-Sackmann and Keith H. Despain.* **189**, 523, 26-C4
- Studies of Evolved Stars. III. Models of FG Sagittae Consistent with *s*-Process Nucleosynthesis. *Roger K. Ulrich.* **192**, 507, 56-F10
- Interstellar Lines in the Ultraviolet Spectrum of Delta Scorpis. *Andrew M. Smith.* **190**, 565, 35-F2
- Color Variations of Scorpius X-1. *D. E. Mook, R. J. Messina, J. Pel, and W. A. Hiltner.* **191**, 493, 45-A2
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. X. Nova FH Serpentis 1970. *John S. Gallagher III and Arthur D. Code.* **189**, 303, 23-D1
- The $^{12}\text{C}/^{13}\text{C}$ Ratio in Stellar Atmospheres. III. Alpha Tauri, Beta Geminorum, and Mu Leonis. *J. Tomkin and D. L. Lambert.* **193**, 631, 71-C1
- Two New Physical Processes in the Far-Ultraviolet Spectrum of Zeta Tauri. *Sara R. Heap and Theodore P. Stecher.* **187**, L27, 3-C10
- The T Tauri Emission Nebula. *Richard D. Schwartz.* **191**, 419, 44-C3
- Rapid Line Variability. I. The Ap Stars Epsilon Ursae Majoris and 73 Draconis. *Michel Breger.* **192**, 71, 50-E14
- Coherent Oscillations in UX Ursae Majoris. *R. Edward Nather and E. L. Robinson.* **190**, 637, 36-D7
- Infrared Spectra of γ^2 Velorum and ζ Puppis. *T. G. Barnes, D. L. Lambert, and A. E. Potter.* **187**, 73, 1-F1
- [α Virginis] The Beta Cephei Nature of Spica. *Robert J. Dukes, Jr.* **192**, 81, 50-F10
- The Structure of Alpha Virginis. II. The Apsidal Constant. *Andrew P. Odell.* **192**, 417, 55-G6
- [α Virginis] The Apsidal Motion Test for Models of Main-Sequence Stars. *Richard Stothers.* **194**, 651, 83-B11
- [W Virginis] Relativistic Terms in Nonlinear Pulsation Theory. *Cecil G. Davis.* **187**, 175, 2-F4
By Henry Draper Number
- A Dust-Shell Model of the Infrared Object HD 45677. *John P. Apruzese.* **188**, 539, 16-G10
- The Holmium Ap Star HD 51418. *Terry J. Jones, Sidney C. Wolff, and Walter K. Bonsack.* **190**, 579, 35-G2
- [HD 77581] 2U 0900-40: A Black Hole? *D. T. Wickramasinghe, N. V. Vidal, M. S. Bessell, B. A. Peterson, and M. E. Perry.* **188**, 167, 11-F4
- Optical Observations of HD 77581 and a Model for the System HD 77581-2U 0900-40. *Larry D. Petro and W. A. Hiltner.* **190**, 661, 36-F7
- The X-Ray Binary HD 77581. *J. B. Hutchings.* **192**, 685, 60-A13
- High-Dispersion Spectroscopic Observations of HD 77581, a Candidate for Vela XR-1(2U 0900-40). *George Wallerstein.* **194**, 451, 79-D14
- Limitations on the Masses and Other Dimensions of the Binary HD 77581. *David R. Mikkelsen and George Wallerstein.* **194**, 459, 79-E9
- [HD 101584] Supergiant Binary Stars. *Roberta M. Humphries and E. P. Ney.* **187**, L75, 6-C12
- A Study of an Early Flare, Radial Velocities, and Parallax Residuals for Possible Orbital Motion of HD 103095 (Groombridge 1830). *W. R. Beardsley, G. Gatewood, and K. W. Kamper.* **194**, 637, 83-A8
- The Oxygen Abundance in the Metal-deficient Star HD 122563. *D. L. Lambert, C. Sneden, and L. M. Ries.* **188**, 97, 11-A9
- Spectroscopic Observations of HD 153919 (2U 1700-37). *Sidney C. Wolff and Nancy D. Morrison.* **187**, 69, 1-E11
- [HD 153919] 2U 1700-37: Another Black Hole? *M. S. Bessell, B. A. Peterson, D. T. Wickramasinghe, and N. V. Vidal.* **187**, 355, 5-C10
- Analysis of the Blue Spectrum of the X-Ray Binary HD 153919. *J. B. Hutchings.* **192**, 677, 60-A6
- The Peculiar A Star HD 168733. II. A Model-Atmosphere Analysis. *Stephen J. Little.* **193**, 639, 71-C8
- A Study of Interstellar Polarization at the $\lambda\lambda$ 4430 and 5780 Features in HD 183143. *P. G. Martin and J. R. P. Angel.* **188**, 517, 16-F4
- An Analysis of the CH Star HD 198269. *Paul Lee.* **192**, 133, 51-B13
- The Peculiar A Star HD 200311: A Photographic-Region Line-Identification Study. *Saul J. Adelman.* **192**, 573, 57-D5; Suppl. **28**, 51 (No. 254)
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XV. The Strongly Magnetic Variable HD 215441. *David S. Leckrone.* **190**, 319, 31-F10
- The Peculiar A Star HD 215441. *Saul J. Adelman.* **190**, 743, 37-E1; Suppl. **27**, 203 (No. 242)
By Other Designation
- On the Nature of BD-10°4662. *R. R. Zappala.* **187**, 257, 4-D1

- Infrared Observations of BD-10°4662. *John A. Hackwell, Bernard W. Bopp, and Robert D. Gehrz.* **192**, L79, 57-F11
- BD+37°1977: A Very Hot Subdwarf. *Sidney C. Wolff, Catherine A. Pilachowski, and Ramon D. Wołstencroft.* **194**, L83, 80-F9
- High-Frequency Stellar Oscillations. X. The Rapid Blue Variable CD-42°14462. *James E. Hesser, Barry M. Lasker, and Patrick S. Osmer.* **189**, 315, 23-D14
- A Determination by the Zeeman Effect of the Magnetic Field Strength in the White Dwarf G99-37. *J. R. P. Angel and J. D. Landstreet.* **191**, 457, 44-E12
- The Nearby Double Star G208-44/45. *R. S. Harrington, C. C. Dahn, and H. H. Guetter.* **194**, L87, 80-F12
- The Peculiar Star He 2-177: A Slow Nova and a Possible X-Ray Source. *Eric D. Carlson and Karl G. Hernize.* **188**, L47, 15-E2
- Photoelectric and Spectroscopic Observations of WRA 795. *N. V. Vidal, D. T. Wickramasinghe, B. A. Peterson, and M. S. Bessell.* **188**, 163, 11-E13
- Optical and X-Ray Observations of 3U 0614+09. *Arthur Davidsson, Roger Malina, Harding Smith, Hyron Spinrad, Bruce Margon, Keith Mason, Frederick Hawkins, and Peter Sanford.* **193**, L25, 66-B9
- The Abundance of Boron and Beryllium in Alpha Lyrae. *Ann Merchant Boesgaard, Françoise Praderie, David S. Leckrone, R. Faraggiana, and M. Hack.* **194**, L143, 84-F1
- Stellar Dynamics**
- NGC 2287 and the Pleiades Group. *O. J. Eggen.* **188**, 59, 10-E3
- Dynamical Friction in Gravitational Systems. *Afaq Ahmad and Leon Cohen.* **188**, 469, 16-B13
- The Galactic Orbit of the Old Open Cluster NGC 2420. *D. W. Keenan and K. A. Innanen.* **189**, 205, 22-C11
- Multiple Star Systems and X-Ray Sources. *J. N. Bahcall, F. J. Dyson, J. I. Katz, and B. Paczyński.* **189**, L17, 21-A1
- The Mass of M31 as Determined from the Motions of its Globular Clusters. *F. D. A. Hartwick and W. L. W. Sargent.* **190**, 283, 31-D3
- On the Stability of a Disk Galaxy. *R. H. Miller.* **190**, 539, 35-D4
- Distribution of Orbital Eccentricities of the Globular Clusters. *Charles J. Peterson.* **190**, L17, 30-E7
- Pulsar-Supernova-Remnant Pairs and the Galactic Gravitational Field. *Eric M. Jones.* **191**, 207, 41-A8
- The Kinematics and Dynamics of M51. I. The Observations. *R. Brent Tully.* **192**, 235, 52-B14; Suppl. **27**, 415 (No. 251)
- The Kinematics and Dynamics of M51. II. Axisymmetric Properties. *R. Brent Tully.* **192**, 235, 52-B14; Suppl. **27**, 437 (No. 251)
- The Kinematics and Dynamics of M51. III. The Spiral Structure. *R. Brent Tully.* **192**, 235, 52-B14; Suppl. **27**, 449 (No. 251)
- On Using Entropy Arguments to Study the Evolution and Secular Stability of Spherical Stellar-Dynamical Systems. *James R. Ipser.* **193**, 463, 68-F5
- On Density Waves in Galaxies. I. Source Terms and Action Conservations. *James W.-K. Mark.* **193**, 539, 70-C9
- A Velocity Separation of Stars and Gas in Carina. *Robert M. Humphries and Frank J. Kerr.* **194**, 301, 78-A2
- Stellar Evolution**
- Multiple Solutions and Secular Stability of a $7 M_{\odot}$ Star with Core Helium and Shell Hydrogen Burning. *D. Lauterborn and R. Siquig.* **187**, 299, 4-F12
- Constraints on the Evolutionary History of Stars Showing s -processed Material. *Barry M. Schlesinger.* **188**, 141, 11-D8
- Period Variation of the Cepheid Zeta Geminorum. *Helmut A. Abt and Saul G. Levy.* **188**, L75, 15-F11
- On the Numbers, Birthrates, and Final States of Moderate- and High-Mass Stars. *J. P. Ostriker, D. O. Richstone, and T. X. Thuan.* **188**, L87, 18-C14
- Differences between the Evolutionary Tracks of Young Stars in the Galaxy and in the Magellanic Clouds. *Gretchen L. Hagen and Sidney van den Bergh.* **189**, L103, 27-C5
- Late Stages of Stellar Evolution in the Light of Elliptical Galaxies. *William K. Rose and Beatrice M. Tinsley.* **190**, 243, 31-A4
- Some Recent Results from Galactic and Stellar Evolution Theory. *Raymond J. Talbot, Jr., and W. David Arnett.* **190**, 605, 26-A11
- Infrared and Optical Observations of Herbig-Haro Objects. *S. E. Strom, G. L. Grasdalen, and K. M. Strom.* **191**, 111, 40-B6
- Theoretical Evolution of Extremely Metal-poor Stars. *Raymond L. Wagner.* **191**, 173, 40-F5
- Island Solutions in Linear Series of Static Stellar Models with Core Helium and Shell Hydrogen Burning for $M = 5, 7$, and $9 M_{\odot}$. *D. Lauterborn and R. A. Siquig.* **191**, 589, 45-G11
- Iron Production by ^{12}C -Detonation Supernovae. *W. David Arnett.* **191**, 727, 48-C2
- Studies of Hydrodynamic Events in Stellar Evolution. III. Ejection of Planetary Nebulae. *G. S. Kutter and Warren M. Sparks.* **192**, 447, 56-B9
- Helium-Shell Flashes in Population I Stars. *B. Paczyński.* **192**, 483, 56-E1
- Galactic Evolution and the Formation of the Light Elements. *Jean Audouze and Beatrice M. Tinsley.* **192**, 487, 56-E5
- Constraints on Models for Chemical Evolution in the Solar Neighborhood. *Beatrice M. Tinsley.* **192**, 629, 59-E1
- CNO Abundances and Hydrodynamic Models of the Nova Outburst. III. $0.5 M_{\odot}$ Models with Enhanced Carbon, Oxygen, and Nitrogen. *Summer Starrfield, Warren M. Sparks, and James W. Truran.* **192**, 647, 59-F5
- The Nature of Faint Blue Stars in the Halo. II. *Jesse L. Greenstein and Anneila I. Sargent.* **192**, 813, 61-C11; Suppl. **28**, 157 (No. 259)
- CNO Abundances and Hydrodynamic Models of the Nova Outburst. II. $1.00 M_{\odot}$ Models with Enhanced Carbon and Oxygen. *Summer Starrfield, Warren M. Sparks, and J. W. Truran.* **192**, 817, 61-C13; Suppl. **28**, 247 (No. 261)
- Effects of Thermal Imbalance on the Pulsational Stability of Stars Undergoing Thermal Runaways. *J. P. Cox.* **192**, L85, 57-G3
- Convective Overshoot Mixing in Old Open Clusters. *M. J. Prather and P. Demarque.* **193**, 109, 64-A12
- On the Origin and Evolution of s -Process Elements. *David N. Schramm and Beatrice M. Tinsley.* **193**, 151, 64-D12
- Advanced Evolution of Massive Stars. V. Neon Burning. *W. David Arnett.* **193**, 169, 64-F2
- Asymptotic Giant-Branch Evolution of a $0.6 M_{\odot}$ Star. *Robert A. Gingold.* **193**, 177, 64-F11
- Old Planetary Nebulae and the Relation between Size and Expansion Velocity. *Thomas J. Bohuski and Malcolm G. Smith.* **193**, 197, 65-A1
- Production of Magnetic Fields in the Interiors of Stars and Several Effects on Stellar Evolution. *E. H. Levy and W. K. Rose.* **193**, 419, 68-C3
- Advanced Evolution in Globular Clusters. I. The Ultraviolet-Bright Stars in Eight Globular Clusters. *Robert Zinn.* **193**, 593, 70-G5
- Stars in the Mass Range $7 < M/M_{\odot} < 10$ as Candidates for Pulsar Progenitors. *Z. Barkat, Y. Reiss, and G. Rakavy.* **193**, L21, 66-B6
- The Subgiant CH Stars. *Howard E. Bond.* **194**, 95, 75-A5
- Advanced Evolution in Globular Clusters. II. The Ultraviolet-Bright Stars in Omega Centauri. *John Norris.* **194**, 109, 75-B4
- Advanced Evolution of Massive Stars. VI. Oxygen Burning. *W. David Arnett.* **194**, 373, 78-F10
- On the Thermal Properties of the Convective Urca Process. *Richard G. Couch and W. David Arnett.* **194**, 537, 80-D8
- The Evolution of the Helium Star Sigma Orionis E. *Andrew P. Odell.* **194**, 645, 83-B6
- The Apsidal-Motion Test for Models of Main-Sequence Stars. *Richard Stothers.* **194**, 651, 83-B11
- Are All Blue Stragglers Close Binaries? *Paul Hintzen, John Scott, and John Whelan.* **194**, 657, 83-C2

Stellar Evolution — Continued

An Additional Constraint on the Early Evolution of the Galaxy from New Observations of 47 Tucanae. *F. D. A. Hartwick and James E. Hesser.* **194**, L129, 84-E2

Stellar Statistics

On the Stellar Content and Reddening in the Nucleus of NGC 5195. *John W. Warner.* **190**, 19, 28-B7

Four-Color Observations of Early-Type Stars. IV. South Galactic Pole. *A. G. Davis Philip.* **190**, 573, 35-F10

Constraints on Models for Chemical Evolution in the Solar Neighborhood. *Beatrice M. Tinsley.* **192**, 629, 59-E1

Stellar Winds

A Model Envelope for the Shell Star 1 Delphini. *J. M. Marlborough and A. P. Cowley.* **187**, 99, 2-A4

Transfer of Resonance-Line Radiation in Differentially Expanding Atmospheres. III. Formation of P Cygni-Type Lines by a Doublet Line or Two Partially "Blended" Lines. *Thomas G. Hewitt and Peter D. Noerdlinger.* **188**, 315, 14-A8

Soft X-Ray Variability of Binary X-Ray Stars. *James Buff and Richard McCray.* **188**, L37, 15-D7

Further Evidence for an Interstellar Source of Nighttime He I 584 Å Radiation. *Francesco Paresce, Stuart Bowyer, and Shailendra Kumar.* **188**, L71, 15-F8

A Model for the Radio Bursts of Cygnus X-3. *K. A. Marsh, C. R. Purton, and P. A. Feldman.* **192**, 697, 60-B9

A Search for Soft X-Ray Emission from Red-Giant Coronae. *Bruce Margon, Keith O. Mason, and Peter W. Sanford.* **194**, L75, 80-F1

Subdwarfs

The Nature of Faint Blue Stars in the Halo. II. *Jesse L. Greenstein and Anneila I. Sargent.* **192**, 813, 61-C11; Suppl. **28**, 157 (No. 259)

BD+37°1977: A Very Hot Subdwarf. *Sidney C. Wolff, Catherine A. Pilachowski, and Ramon D. Woltscraft.* **194**, L83, 80-F9

Sun

Research with Solar Satellites. *Leo Goldberg.* **191**, 1, 39-A4

Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from Skylab. *Martin C. E. Huber, P. V. Foukal, R. W. Noyes, E. M. Reeves, E. J. Schmahl, J. G. Timothy, J. E. Vernazza, and G. L. Withbroe.* **194**, L115, 81-B2

Sunspots

Sunspot Models with Alfvén Wave Emission. *D. J. Mullan.* **187**, 621, 9-A1

Extreme-Ultraviolet Observations of Sunspots with the Harvard Spectrometer on the Apollo Telescope Mount. *P. V. Foukal, M. C. E. Huber, R. W. Noyes, E. M. Reeves, E. J. Schmahl, J. G. Timothy, J. E. Vernazza, and G. L. Withbroe.* **193**, L143, 73-A10

Supernova Remnants

X-Ray Emission from an Inward-propagating Shock in Young Supernova Remnants. *Christopher F. McKee.* **188**, 335, 14-B13

The Evolution of Supernova Remnants. I. Spherically Symmetric Models. *Roger A. Chevalier.* **188**, 501, 16-E2

The Evolution of the Radio Spectrum of Cassiopeia A. *W. A. Dent, H. D. Aller, and E. T. Olsen.* **188**, L11, 12-C12

Detection of the [Fe XIV] Coronal Line at 5303 Å in the Cygnus Loop. *B. E. Woodgate, H. S. Stockman, Jr., J. R. P. Angel, and R. P. Kirshner.* **188**, L79, 18-C6

Photoelectric Spectrophotometry of the Cygnus Loop. *Joseph S. Miller.* **189**, 239, 22-F1

Large-Scale Effects of Supernova Remnants on the Galaxy: Generation and Maintenance of a Hot Network of Tunnels. *Donald P. Cox and Barham W. Smith.* **189**, L105, 27-C7

Dust Grains in a Hot Gas. II. Astrophysical Applications. *Joseph Silk and John Robert Burke.* **190**, 11, 28-A14

Numerical Models of the Evolution of Supernova Remnants: The Shell-Formation Stage. *W. C. Straka.* **190**, 59, 28-E5

Numerical Models for Supernova Remnants. V. *N. Mansfield and E. E. Salpeter.* **190**, 305, 31-E10

SAS-2 Observations of the High-Energy Gamma Radiation from the Vela Region. *D. J. Thompson, G. F. Bignami, C. E. Fichtel, and D. A. Kniffen.* **190**, L51, 33-F4

Pulsar-Supernova-Remnant Pairs and the Galactic Gravitational Field. *Eric M. Jones.* **191**, 207, 41-A8

A High-Sensitivity Pulsar Survey. *R. A. Hulse and J. H. Taylor.* **191**, L59, 46-B3

X-Ray Observations of the Supernova Remnant IC 443. *P. Frank Winkler, Jr., and George W. Clark.* **191**, L67, 46-B9

On the Velocity Dependence of the Interstellar Na I/Ca II Ratio. *Richard S. Siluk and Joseph Silk.* **192**, 51, 50-D4

The Evolution of Supernova Remnants. II. Models of an Explosion in a Plane-stratified Medium. *Roger A. Chevalier and John Gardner.* **192**, 457, 56-C4

The X-Ray Spectra of the Vela and Puppis Supernova Remnants and the Shock-Wave Model of Supernova Remnants. *Paul Gorenstein, Frank R. Harnden, Jr., and Wallace H. Tucker.* **192**, 661, 59-G4

Neutron Stars in Close Binary Systems. *J. Craig Wheeler, C. F. McKee, and M. Lecar.* **192**, L71, 57-F4

A New Optical Supernova Remnant in Centaurus. *Nelson J. Irvine and Cynthia E. Irvine.* **192**, L111, 61-E2

Do Supernova Remnants Provide the Cosmic-Ray Electrons? *John R. Dickel.* **193**, 755, 72-E1

Spectrophotometry of the Crab Nebula. *Robert P. Kirshner.* **194**, 323, 78-B12

X-Ray Structure of the Cygnus Loop. *S. Rappaport, R. Doxsey, A. Solinger, and R. Borken.* **194**, 329, 78-C3

The Gamma Cygni Supernova Remnant and Nebula. *Hugh M. Johnson.* **194**, 337, 78-C11

An Upper Limit to an X-Ray Point Source at the Center of the Cygnus Loop. *M. C. Weisskopf, H. Helava, and R. S. Wolff.* **194**, L71, 80-E10

Supernovae

The Formation of Deuterium and the Light Elements by Spallation in Supernova Shocks. *Stirling A. Colgate.* **187**, 321, 5-A4

Early Gamma Rays from Supernovae. *S. A. Colgate.* **187**, 333, 5-B2

Type I Supernovae. *J. Craig Wheeler.* **187**, 337, 5-B5

Supernova: The Result of the Death Spiral of a White Dwarf into a Red Giant. *Warren M. Sparks and Theodore P. Stecher.* **188**, 149, 11-E1

Line ^{57}Co Gamma Rays: New Diagnostic of Supernova Structure. *Donald D. Clayton.* **188**, 155, 11-E6

The Evolution of Supernova Remnants. I. Spherically Symmetric Models. *Roger A. Chevalier.* **188**, 501, 16-E2

On the Numbers, Birthrates, and Final States of Moderate- and High-Mass Stars. *J. P. Ostriker, D. O. Richstone, and T. X. Thuan.* **188**, L87, 18-C14

Statistical Time-dependent Model for the Interstellar Gas. *Humberto Gerola, Minas Kafatos, and Richard McCray.* **189**, 55, 19-E1

On the Recombination-Line Observations toward Supernova 3C 391. *E. J. Chaisson.* **189**, 69, 19-F3

Do OB Runaways Have Collapsed Companions? *Jacob D. Bekenstein and Richard L. Bowers.* **190**, 653, 36-E11

Can Supernovae Produce Deuterium? *Richard I. Epstein, W. David Arnett, and David N. Schramm.* **190**, L13, 30-E3

Penetration of a Low-Frequency Magnetic Wave into a Nebula Plasma. *William K. Rose, Nicholas A. Krall, and Paulett C. Liewer.* **191**, 201, 41-A3

Do Pulsars Make Supernovae? II. Calculations of Light Curves for Type II Events. *Peter Bodenheimer and Jeremiah P. Ostriker.* **191**, 465, 44-F6

Iron Production by ^{13}C -Detonation Supernovae. *W. David Arnett.* **191**, 727, 48-C2

Electron-Ion Relaxation in a Dense Plasma. *J. E. Littleton and J.-R. Buchler.* **191**, 731, 48-C5

Limit on X-Ray Emission from a Supernova during Maximum Light. *G. F. Sprott, H. V. Bradt, G. W. Clark, W. H. G. Lewin, H. W. Schnopper, L. Pigatto, and L. Rosino.* **191**, 739, 48-C13

- Photometric Properties of Model Spherical Galaxies.** *Richard B. Larson and Beatrice M. Tinsley.* **192**, 293, 54-D11
- Relativistic Ejection of a Particle by Radiation Pressure. II.** *Peter D. Noerdlinger.* **192**, 529, 57-A5
- Light-Decay Curve of the Supernova in IC 4182.** *James R. Van Hise.* **192**, 657, 59-G1
- Dissipation in Supernova Shock Waves.** *T. A. Weaver and G. F. Chapline.* **192**, L57, 57-E6
- A Search for X-Rays from Supernova 1972e with Uhuru and OSO-7.** *C. R. Canizares, J. E. Neighbours, and T. Matilsky.* **192**, L61, 57-E10
- Distances to Extragalactic Supernovae.** *Robert P. Kirshner and John Kwan.* **193**, 27, 63-C1
- On the *e*-Process: Its Components and Their Neutron Excesses.** *Kem L. Hainebach, Donald D. Clayton, W. David Arnett, and S. E. Woosley.* **193**, 157, 64-E3
- Production of Magnetic Fields in the Interiors of Stars and Several Effects on Stellar Evolution.** *E. H. Levy and W. K. Rose.* **193**, 419, 68-C3
- Upper Limit to the X-Ray Flux from the Supernova in NGC 5253 above 7 keV from the OSO-7.** *M. P. Ulmer, W. A. Baity, Wm. A. Wheaton, and L. E. Peterson.* **193**, 535, 70-C6
- On the Thermal Properties of the Convective Urca Process.** *Richard G. Couch and W. David Arnett.* **194**, 537, 80-D8
- Synchrotron Radiation**
- Scorpius X-1: Origin of the Radio and Hard X-Ray Emissions.** *R. Ramaty, C. C. Cheng, and S. Tsuruta.* **187**, 61, 1-E3
 - Inverse Compton Radiation and the Magnetic Field in Clusters of Galaxies.** *D. E. Harris and W. Romanishin.* **188**, 209, 13-A3
 - Physics of Compact Nonthermal Sources. I. Theory of Radiation Processes.** *T. W. Jones, S. L. O'Dell, and W. A. Stein.* **188**, 353, 14-D2
 - Turbulence-enhanced Synchrotron Radiation in the Galaxy.** *R. Cowis and J. Mitteldorf.* **189**, 51, 19-D12
 - Polarization of Inverse Plasmon Scattering.** *R. A. Windsor and P. J. Kellogg.* **190**, 167, 29-E14
 - Physics of Compact Nonthermal Sources. II. Determination of Physical Parameters.** *T. W. Jones, S. L. O'Dell, and W. A. Stein.* **192**, 261, 54-B8
 - Polarization of Radio Sources. V. Absorption Effects on Circular Repolarization in Compact Sources.** *A. G. Pacholczyk and T. L. Swihart.* **192**, 591, 59-B8
 - Physics of Compact Nonthermal Sources. III. Energetic Considerations.** *G. R. Burbidge, T. W. Jones, and S. L. O'Dell.* **193**, 43, 63-D4
 - Interpretation of Saturn's Decimetric Radio Emission.** *J. J. Condon, M. J. Yerbury, and D. L. Jauncey.* **193**, 257, 65-E1
 - Do Supernova Remnants Provide the Cosmic-Ray Electrons?** *John R. Dickel.* **193**, 755, 72-E1
 - The Nature of Cygnus X-3 Radio Outbursts from an Analysis of Radiofrequency Spectra.** *P. C. Gregory and E. R. Sequist.* **194**, 715, 83-G1
- Transition Probabilities**
- A Theoretical and Experimental Study of Fe xix to Fe xxiv Solar-Flare Spectra and Isoelectronic Spectra in Sulfur.** *B. C. Fawcett, R. D. Cowan, and R. W. Hayes.* **187**, 377, 5-E3
 - Reinvestigation of Rotational-Line Intensity Factors in Diatomic Spectra.** *Ellis E. Whiting and Ralph W. Nicholls.* **187**, 661, 9-C10; Suppl. 27, 1 (No. 235)
 - Theoretical Analysis of the Al I Absorption Spectrum.** *C. D. Lin.* **187**, 835, 5-E10
 - Hook-Method Measurements of *g*-Values for Ultraviolet Fe I and Fe II Lines on a Shock Tube.** *Martin C. E. Huber.* **190**, 237, 30-C10
 - Dipole and Quadrupole Integrals for the C I, N I, and O I Sequences.** *Sidney O. Kastner and Clarence Wade.* **190**, 745, 37-E2; Suppl. 27, 247 (No. 243)
 - Rotational Excitation of HCN by Collisions.** *Sheldon Green and Patrick Thaddeus.* **191**, 653, 47-D13
 - Radiative Transitions Involving the (2p²) ³Pr Metastable Au**
- todetecting State of H⁻.** *V. L. Jacobs, A. K. Bhatia, and A. Temkin.* **191**, 785, 48-G1
- Rate Coefficients for Electron Excitation of the First Resonance Transition in H, Li, Na, Ca, Ca⁺, Ba⁺ Calculated from Experimental Data.** *D. H. Crandall, G. H. Dunn, A. Gallagher, D. G. Hummer, C. V. Kunasz, D. Leep, and P. O. Taylor.* **191**, 789, 48-G5
- Oscillator Strengths for Neutral Sodium and the Interstellar Sodium Abundance in Zeta Ophiuchi.** *Peter Erman, J. Brzozowski, and Wm. Hayden Smith.* **192**, 59, 50-D11
- Electronic Transitions of the ZrO Molecule: Triplet Systems.** *L. Schoonveld and S. Sundaram.* **192**, 207, 52-A1
- Multiplet Splittings and ¹S₀-³P₁ Intercombination-Line Oscillator Strengths in Be I and Mg I.** *C. Laughlin and G. A. Victor.* **192**, 551, 57-B12
- Arc Measurements of Fe I Oscillator Strengths.** *J. M. Bridges and R. L. Kornblith.* **192**, 793, 61-B5
- Small Silicon Molecules: Possible Sources of the Unidentified Molecular Lines U81.5, U86.2, U89.2, and U90.7.** *Frank J. Lovas.* **193**, 265, 65-E9
- Oscillator Strengths in the TiO Alpha-Band System.** *A. R. Fairbairn, S. J. Wolnik and R. O. Berthel.* **193**, 273, 65-F3
- Electron-Impact Excitation Cross-Sections for Complex Ions.**
 - I. Theory for Ions with One and Two Valence Electrons.
 - Douglas H. Sampson.* **193**, 289, 65-G5; Suppl. 28, 309 (No. 263)
 - II. Application to the Isoelectronic Series of Helium and Other Light Elements.
 - Douglas H. Sampson and Allen D. Parks.* **193**, 289, 65-G5; Suppl. 28, 323 (No. 263)
- On the Interstellar Abundance of the CH⁺ Radical.** *J. Brzozowski, N. Elander, P. Erman, and M. Lyra.* **193**, 741, 72-D1
- Effects of a Free-free Radio Continuum on the Populations of High Atomic Levels at Low Temperatures and Densities.** *J. A. Ahmad.* **194**, 503, 80-B5
- Radiative and Predissociation Probabilities for Individual Rotational Levels of the B ¹D₂ State of CH with Application to the Radiative Recombination of CH in the Interstellar Medium.** *Neil H. Brooks and Wm. Hayden Smith.* **194**, 513, 80-C1
- Plasma-screening Effects upon Atomic Hydrogen Photoabsorption.** *Jon C. Weisheit and Bruce W. Shore.* **194**, 519, 80-C6
- Forbidden-Line Excitation Data for Certain Coronal Lines.** *S. J. Czyzak, L. H. Aller, and R. N. Euwema.* **195**, 251, 3-D6; Suppl. 28, 465 (No. 272)
- Turbulence**
- Turbulence-enhanced Synchrotron Radiation in the Galaxy.** *R. Cowis and J. Mitteldorf.* **189**, 51, 19-D12
 - Metallicism in Border Regions of the Am Domain. III. Analysis of the Hot Stars Alpha Geminorum A and B and Theta Leonis.** *Myron A. Smith.* **189**, 101, 20-A7
 - Hydraulic Concentration of Magnetic Fields in the Solar Photosphere. I. Turbulent Pumping.** *E. N. Parker.* **189**, 563, 26-F1
 - Seeing: Its Cause and Cure.** *A. T. Young.* **189**, 587, 26-G11
 - Dynamics of the Solar Magnetic Field. II. The Energy Spectrum of Large-Scale Solar Magnetic Fields.** *Y. Nakagawa and Randolph H. Levine.* **190**, 441, 33-A5
 - A Variational Approach to Charged-Particle Transport.** *Ian Lerche.* **193**, 711, 72-A12
 - Recovery of Images from Atmospherically Degraded Short-Exposure Photographs.** *Keith T. Knox and Brian J. Thompson.* **193**, L45, 66-D1
 - The Impossibility of Plasma Radiation from Electron Plasma Wave Turbulence within Collisionless Shock Waves.** *Dean F. Smith and N. A. Krall.* **194**, L163, 84-G8
- 21-Centimeter Radiation**
- H I Emission from Stephan's Quintet.** *G. S. Shostak.* **187**, 19, 1-B4
 - A Deviation-Defect Method for the Detection of Optically Thick Neutral Hydrogen.** *P. L. Baker.* **187**, 223, 4-A11

21-Centimeter Radiation — Continued

- Optical Interstellar Line Studies of a Nearby Cold Cloud. *Richard M. Crutcher and Kurt W. Riegel.* **188**, 481, 16-C10
- Studies of Neutral-Hydrogen Cloud Structure. *G. L. Verschuur.* **188**, 669, 18-B13; Suppl. **27**, 65 (No. 238)
- The Stability of Galaxy Clusters: Neutral Hydrogen Observations. *David S. De Young and Morton S. Roberts.* **189**, 1, 19-A5
- Detection of Radio Recombination-Line Emission from the Rho Ophiuchi Dark Cloud. *Robert L. Brown and G. R. Knapp.* **189**, 253, 22-G3
- A Distance Limit for NGC 7318B in Stephan's Quintet. *G. S. Shostak.* **189**, L1, 20-G1
- A Redetermination of the Galactic H I Half-Thickness and a Discussion of Some Dynamical Consequences. *P. D. Jackson and Sanford A. Kellman.* **190**, 53, 28-D13
- The Magellanic Stream. *D. S. Mathewson, M. N. Cleary, and J. D. Murray.* **190**, 291, 31-D9
- Studies of Neutral Hydrogen Cloud Structure in the Vicinity of the North Polar Spur. *G. L. Verschuur.* **191**, 288, 41-G2; Suppl. **27**, 283 (No. 245)
- Gas Density and the Rate of Star Formation in M33. *Barry F. Madore, Sidney van den Bergh, and David H. Rogstad.* **191**, 317, 43-C2
- A Study of the H I Absorption in the Galaxy M82 by Radio Interferometry. *L. Welischew.* **191**, 639, 47-D2
- Aperture-Synthesis Observations of H I in the Galaxy M83. *D. H. Rogstad, I. A. Lockhart, and M. C. H. Wright.* **193**, 309, 67-B7
- Low-Density Ionized Interstellar Gas as Revealed by Interstellar Optical and H I Radio Lines. *Carl Heiles.* **193**, L31, 66-C3
- An Experimental Test of the Homogeneity of the Interstellar Medium. *P. L. Baker.* **194**, 271, 77-E8
- A Velocity Separation of Stars and Gas in Carina. *Roberta M. Humphreys and Frank J. Kerr.* **194**, 301, 78-A2
- Fine-Scale Structure of a Cold Hydrogen Layer. *P. L. Baker.* **194**, L109, 81-A6

U Geminorum Stars

- Possible Detection of Very Soft X-Rays from SS Cygni. *S. Rappaport, W. Cash, R. Doxsey, J. McClintock, and G. Moore.* **187**, L5, 3-B5
- The Nature of Cygnus X-3: A Prototype for Old-Population Binary X-Ray Sources. *Arthur Davidsen and Jeremiah P. Ostriker.* **189**, 331, 23-F1
- The Mass of the Dwarf Nova EM Cygni. *Edward L. Robinson.* **193**, 191, 64-G10
- Ultraviolet Detection of the Dwarf Nova SS Cygni. *Albert V. Holm and John S. Gallagher III.* **192**, 425, 56-A1
- Rapid Light Variations of YZ Cancri: An Unusual SS Cygni Star. *Thomas J. Moffett and Thomas G. Barnes III.* **194**, 141, 75-D6

Ultraviolet

- Orbital Elements and Absolute Dimensions of the Eclipsing System LY Aurigae. *George E. McCluskey, Jr., and Yoji Kondo.* **187**, 93, 1-G12
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIII. The Albedos of Jupiter, Uranus, and Neptune. *Blair D. Savage and John J. Caldwell.* **187**, 197, 2-G8
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIV. An Extension of the Survey of Lyman- α Absorption from Interstellar Hydrogen. *Edward B. Jenkins and Blair D. Savage.* **187**, 243, 4-C1
- The Spatial Distribution of Lyman- α on the Sun. *D. K. Prinz.* **187**, 369, 5-D9
- On the Opacity of the Interstellar Medium to Ultrasoft X-Rays and Extreme-Ultraviolet Radiation. *Raymond Crudace, Francesco Paresce, Stuart Bowyer, and Michael Lampton.* **187**, 497, 7-F1
- Ultraviolet Photometry from the Orbiting Astronomical Observatory. XI. The 1971 Eclipse of 32 Cygni. *L. R. Doherty, J. F. McNall, and A. V. Holm.* **187**, 521, 8-A1
- OAO-2 Observations of the Helium Spectrum Variable a Cen-

tauri. *Michael R. Molnar.* **187**, 531, 8-A11

- Observations of He I 584 Å Nighttime Radiation: Evidence for an Interstellar Source of Neutral Helium. *Francesco Paresce, Stuart Bowyer, and Shailendra Kumar.* **187**, 633, 9-A12
- Stellar Spectral Synthesis in the Ultraviolet. *Robert L. Kurucz.* **188**, L21, 12-D6
- Observations of the Chromospheric Network: Initial Results from the Apollo Telescope Mount. *E. M. Reeves, P. V. Foukal, M. C. E. Huber, R. W. Noyes, E. J. Schmahl, J. G. Timothy, J. E. Vernazza, and G. L. Withbroe.* **188**, L27, 12-D11

Ultraviolet Photometry from the Orbiting Astronomical Observatory. X. Nova FH Serpentis 1970. *John S. Gallagher III and Arthur D. Code.* **189**, 303, 23-D1

Solar Coronal Line Profiles in the Extreme-Ultraviolet. *U. Feldman and W. E. Behring.* **189**, L45, 21-C1

Ultraviolet Detection of the Nova Variables V603 Aquilae and RR Pictoris. *J. S. Gallagher and A. V. Holm.* **189**, L123, 27-D10

Ultraviolet Photometry from the Orbiting Astronomical Observatory. XV. The Strongly Magnetic Variable HD 215441. *David S. Leckrone.* **190**, 319, 31-F10

Research with Solar Satellites. *Leo Goldberg.* **191**, 1, 39-A4

Formation and Destruction Rates of Interstellar H₂. *M. Jura.* **191**, 375, 43-G1

Ultraviolet Television Data from the Orbiting Astronomical Observatory. II. Stellar Ultraviolet Colors and Interstellar Extinction. *Eric Peyremann and Robert J. Davis.* **192**, 815, 61-C12; Suppl. **28**, 211 (No. 260)

Ultraviolet Detection of the Dwarf Nova SS Cygni. *Albert V. Holm and John S. Gallagher III.* **192**, 425, 56-A1

Ultraviolet Spectrophotometry of Sirius from Gemini 12. *G. G. Spear, Y. Kondo, and K. G. Henize.* **192**, 615, 59-D2

Evidence for a Corona of Beta Geminorum. *Humberto Gerola, Jeffrey L. Linsky, Richard Shine, W. McClintock, R. C. Henry, and H. W. Moos.* **193**, L107, 72-F1

A Survey with Copernicus of Interstellar O VI Absorption. *Edward B. Jenkins and Debra Anne Meloy.* **193**, L121, 72-G1

BD+37° 1977: A Very Hot Subdwarf. *Sidney C. Wolff, Catherine A. Pilachowski, and Ramon D. Wolkencroft.* **194**, L83, 80-F9

On the Fe XXIV Emission in the Solar Flare of 1973 June 15. *Kenneth G. Widner and Chung-Chieh Cheng.* **194**, L111, 81-A8

Extreme-Ultraviolet Observations of Coronal Holes: Initial Results from Skylab. *Martin C. E. Huber, P. V. Foukal, R. W. Noyes, E. M. Reeves, E. J. Schmahl, J. G. Timothy, J. E. Vernazza, and G. L. Withbroe.* **194**, L115, 81-B2

Uranus

Ultraviolet Photometry from the Orbiting Astronomical Observatory. XIII. The Albedos of Jupiter, Uranus, and Neptune. *Blair D. Savage and John J. Caldwell.* **187**, 197, 2-G8

On the Identification of the 6420 Å Absorption Feature in the Spectra of Uranus and Neptune. *Tobias Owen, Barry L. Lutz, Carolyn C. Porco, and Jerry H. Woodman.* **189**, 379, 24-B10

The Search for HD in the Spectrum of Uranus: An Upper Limit to [D/H]. *Barry L. Lutz and Tobias Owen.* **190**, 731, 37-D3

The Visible Spectrum of Uranus. *R. E. Danielson.* **192**, L107, 58-A10

Evidence for an Internal Heat Source in Neptune. *Robert E. Murphy and Laurence M. Trafton.* **193**, 253, 65-D12

Infrared Measurements of Uranus and Neptune. *G. H. Rieke and F. J. Low.* **193**, L147, 73-B1

Variable Stars

High-Frequency Stellar Oscillations. X. The Rapid Blue Variable CD-42°14462. *James E. Hesser, Barry M. Lasker, and Patrick S. Osmer.* **189**, 315, 23-D14

FG Sagittae: The s-Process Episode. *G. E. Langer, Robert P. Kraft, and Kurt S. Anderson.* **189**, 509, 26-B5

An Interpretation of the Puzzling Observations of FG Sagittae.

- I-Juliana Christy-Sackmann and Keith H. Despain.* **189**, 523, 26-C4
- Mean Absolute Magnitudes of Carbon Stars and Related Objects. *John H. Baumert.* **190**, 85, 28-G4
- Short-Time Optical Variability of X-Ray Sources. *Y. Avni and J. N. Bahcall.* **191**, 221, 41-B6
- The Calculation of Periodic Pulsations of Stellar Models. *R. F. Stellingwerf.* **192**, 139, 51-C5
- High-Frequency Optical Variables. II. Luminosity-Variable White Dwarfs and Maximum Entropy Spectral Analysis. *Harvey B. Richer and Tad J. Ulyrch.* **192**, 719, 60-D2
- A Search for Additional Radio Sources in the Kukarkin Variable Star Catalog. *David B. Shaffer and Gregory A. Shields.* **192**, L83, 57-G1
- Optical Studies of Uhuru Sources. X. The Photometric History of He 2-177 (= 3U 1639 - 62°). *W. Liller.* **192**, L89, 57-G6
- Silicon Monoxide: Detection of Maser Emission from the Second vibrationally Excited State. *David Buhl, Lewis E. Snyder, Frank J. Lovas, and Donald R. Johnson.* **192**, L97, 58-A1
- The Identification and *UBV* Photometry of the Visible Component of the Centaurus X-3 System. *W. Krzeminski.* **192**, L135, 61-G2
- Asymptotic Giant-Branch Evolution of a 0.6 M_{\odot} Star. *Robert A. Gingold.* **193**, 177, 64-F11
- Venus.**
- Radiative Transfer within the Mesospheres of Venus and Mars. *V. Ramanathan and R. D. Cess.* **188**, 407, 15-A5
 - Sulfuric Acid Cloud Interpretation of the Infrared Spectrum of Venus. *John V. Martonchik.* **193**, 495, 69-A8
- Visual Double or Multiple Stars**
- The Age of Alpha Centauri. *Ann Merchant Boesgaard and Wendy Hagen.* **189**, 85, 19-G4
 - On the Inclination of Rotation Axes in Visual Binaries. *Edward W. Weis.* **190**, 331, 31-G8
 - The Local Mass Density. *Glenn J. Veeder.* **191**, L57, 46-B1
 - Parallax, Orbit, and Mass of the Binary Star 70 Ophiuchi. *Michael D. Worth and Wulf D. Heintz.* **193**, 647, 71-D1
 - Lunar Occultation Summary. I. *J. J. Eitter and W. I. Beavers.* **194**, 213, 76-B11; Suppl. **28**, 405 (No. 269)
 - Micrometric Measures of Double Stars. *G. Van Biesbroeck.* **194**, 541, 80-D11; Suppl. **28**, 413 (No. 270)
 - The Evolution of the Helium Star Sigma Orionis E. *Andrew P. Odell.* **194**, 645, 83-B6
- Weak-Lined Stars**
- The Oxygen Abundance in the Metal-deficient Star HD 122563. *D. L. Lambert, C. Sneden, and L. M. Ries.* **188**, 97, 11-A9
 - Carbon and Nitrogen Abundances in Metal-poor Stars. *Christopher Sneden.* **189**, 493, 26-A4
- White-Dwarf Stars**
- The Transfer of Circularly Polarized Radiation. *George W. Collins II and Paul F. Buerger.* **187**, 163, 2-E7
 - Type I Supernovae. *J. Craig Wheeler.* **187**, 337, 5-B5
 - Discovery of Time-Varying Circular and Linear Polarization in the White-Dwarf Suspect GD 229. *John B. Swedlund, Ramon D. Wolstencroft, Joseph J. Michalsky, Jr., and James C. Kemp.* **187**, L121, 9-E12
 - Thermal Pulses in Helium Shell-burning Stars. III. *R. A. Gingold and D. J. Faulkner.* **188**, 145, 11-D11
 - Supernova: The Result of the Death Spiral of a White Dwarf into a Red Giant. *Warren M. Sparks and Theodore P. Stecher.* **188**, 149, 11-E11
 - Absolute Spectral Energy Distributions for White Dwarfs. *J. B. Oke.* **188**, 443, 15-C13; Suppl. **27**, 21 (No. 236)
 - High-Frequency Stellar Oscillations. X. The Rapid Blue Variable CD-42°14462. *James E. Hesser, Barry M. Lasker, and Patrick S. Ossmer.* **189**, 315, 23-D14
 - The Effects of Rapid, Differential Rotation on the Spectra of White Dwarfs. *Robert L. Milton.* **189**, 543, 26-D9
 - An Investigation of Accretion of Matter onto White Dwarfs as a Possible X-Ray Mechanism. *A. J. DeGregoria.* **189**, 555, 26-E7
- On the Linear Polarization of GD-229. *James C. Kemp, George V. Coyne, S.J., John B. Swedlund, and Ramon D. Wolstencroft.* **189**, L79, 24-F6
- A New List of 52 Degenerate Stars. VII. *Jesse L. Greenstein.* **189**, L131, 27-E4
- Are the UV Stars Nuclear-Powered? *J. G. Hills.* **190**, 109, 29-A14
- Observations for Broad-Band Circular Polarization in White Dwarfs and Nuclei of Planetary Nebulae. *A. Rich and W. L. Williams.* **190**, 117, 29-B8
- The Wavelength Dependence of Circular Polarization in GD 229. *J. D. Landstreet and J. R. P. Angel.* **190**, L25, 30-F1
- The Spectrum of the Polarized White Dwarf GD 229. *Jesse L. Greenstein, Maarten Schmidt, and Leonard Searle.* **190**, L27, 30-F3
- G240-72: A New Magnetic White Dwarf with Unusual Polarization. *J. R. P. Angel, P. Hintzen, P. A. Strittmatter, and P. G. Martin.* **190**, L71, 33-G9
- A Determination by the Zeeman Effect of the Magnetic Field Strength in the White Dwarf G99-37. *J. R. P. Angel and J. D. Landstreet.* **191**, 457, 44-E12
- Nucleosynthesis in White-Dwarf Atmospheres. *Fred Hoyle and Donald D. Clayton.* **191**, 705, 48-A8
- Further Observations for Circularly Polarized Radiation from White Dwarfs and X-Ray Sources. *D. N. Brown, A. Rich, and W. L. Williams.* **191**, L111, 49-A11
- CNO Abundances and Hydrodynamic Models of the Nova Outburst. III. 0.05 M_{\odot} Models with Enhanced Carbon, Oxygen, and Nitrogen. *Summer Starrfield, Warren M. Sparks, and James W. Truran.* **192**, 647, 59-F5
- High-Frequency Optical Variables. II. Luminosity-Variable White Dwarfs and Maximum Entropy Spectral Analysis. *Harvey B. Richer and Tad J. Ulyrch.* **192**, 719, 60-D2
- CNO Abundances and Hydrodynamic Models of the Nova Outburst. II. 1.00 M_{\odot} Models with Enhanced Carbon and Oxygen. *Summer Starrfield, Warren M. Sparks, and J. W. Truran.* **192**, 817, 61-C13; Suppl. **28**, 247 (No. 261)
- DQ Herculis: Weak Sister to HZ Herculis. *D. Q. Lamb.* **192**, L129, 61-F11
- The Effects of Differences in Composition, Equation of State, and Mixing Length upon the Structure of White-Dwarf Convective Zones. *G. Fontaine, H. M. Van Horn, K.-H. Böhm, and T. C. Grenfell.* **193**, 205, 65-A9
- Hydrogen and Helium Features in Magnetic White Dwarfs. *S. B. Kemic.* **193**, 213, 65-B2
- X-Ray Emission from Vibrating White Dwarfs. *J. I. Katz and E. E. Salpeter.* **193**, 429, 68-C12
- Quadratic Zeeman Effect in the Hydrogen Balmer Lines from Magnetic White Dwarfs. *G. L. Surmelian and R. F. O'Connell.* **193**, 705, 72-A6
- Gamma-Ray Bursts from Magnetic White Dwarfs. *G. Channugam.* **193**, L75, 69-D6
- A Spectroscopic Search for Cool White Dwarfs. *Paul Hintzen and P. A. Strittmatter.* **193**, L111, 72-F5
- Plasma-screening Effects upon Atomic Hydrogen Photoabsorption. *Jon C. Weisheit and Bruce W. Shore.* **194**, 519, 80-C6
- Discovery of a Magnetic DA White Dwarf. *J. R. P. Angel, R. F. Carswell, P. A. Strittmatter, E. A. Beaver, and R. Harms.* **194**, L47, 76-F6
- Spectrophotometry of Magnetic Degenerate Stars. *Jesse L. Greenstein.* **194**, L51, 76-F10
- Wolf-Rayet Stars**
- Infrared Spectra of γ^2 Velorum and ζ Puppis. *T. G. Barnes, D. L. Lambert, and A. E. Potter.* **187**, 73, 1-F1
 - Short-Term Spectral Variability of γ^2 Velorum. Photometric Observations. *A. Sanyal, W. Weller, and S. Jefferts.* **187**, L31, 3-D1
 - Polarization by Rotationally Distorted Electron-Scattering Atmospheres. *Joseph P. Cassinelli and Bernhard M. Haisch.* **188**, 101, 11-A13

Wolf-Rayet Stars — Continued

- Some Morphological Properties of WN Spectra. *Nolan R. Walborn*. **189**, 269, 23-A11
 The Effect of Sphericity on Stellar Continuous Energy Distributions. *John I. Castor*. **189**, 273, 23-B1
 Infrared Photometry of Wolf-Rayet Stars from 2.3 to 23 Microns. *J. A. Hackwell, R. D. Gehrz, and J. R. Smith*. **192**, 383, 55-D11
 Circumstellar Dust Emission from WC9 Stars. *R. D. Gehrz and J. A. Hackwell*. **194**, 619, 82-G4

X-Ray Sources

- Observation of Gamma-Radiation from the Galactic Center Region. *G. H. Share, R. L. Kinzer, and N. Seeman*. **187**, 45, 1-D1
 Spectroscopic Observations of HD 153919 (2U 1700-37). *Sidney C. Wolff and Nancy D. Morrison*. **187**, 69, 1-E11
 Extended Observations of >7-keV X-Rays from Centaurus X-3 by the OSO-7 Satellite. *W. A. Baity, M. P. Ulmer, W. A. Wheaton, and L. E. Peterson*. **187**, 341, 5-B9
 Spectroscopic Observations of HZ Herculis. *David Crampton*. **187**, 345, 5-B13
 Do Cosmic Rays Heat HZ Herculis? *K. Brecher and P. Morrison*. **187**, 349, 5-C5
 A Determination of the Cooling Time and the Speed of the Surface Currents of HZ Herculis. *Richard E. Dahab*. **187**, 351, 5-C7
 2U 1700-37: Another Black Hole? *M. S. Bessell, B. A. Peterson, D. T. Wickramasinghe, and N. V. Vidal*. **187**, 355, 5-C10
 A Search for Soft X-Ray Sources in the Galactic Anticenter. Absorption of X-Rays from the Crab Nebula. *R. W. Hill, G. A. Burgin, F. D. Seward, J. P. Stoering, and A. Toor*. **187**, 505, 7-F9
 A Slaved Disk Model for Hercules X-1. *Wm. James Roberts*. **187**, 575, 8-D11
 Possible Detection of Very Soft X-Rays from SS Cygni. *S. Rappaport, W. Cash, R. Doxsey, J. McClintock, and G. Moore*. **187**, L5, 3-B5
 Southern Radio Sources Possibly Identified with X-Ray Sources. *N. Sanduleak and J. F. Dolan*. **187**, L73, 6-C10
 The Poynting-Robertson Effect and Eddington Limit for Electrons Scattering with Hard Photons. *George R. Blumenthal*. **188**, 121, 11-C4
 A Ten-Day Observation of Hercules X-1 from the OSO-7 Satellite. *J. E. McClintock, G. W. Clark, W. H. G. Lewin, H. W. Schnopper, C. R. Canizares, and G. F. Sprott*. **188**, 159, 11-E9
 Photoelectric and Spectroscopic Observations of WRA 795. *N. V. Vidal, D. T. Wickramasinghe, B. A. Peterson, and M. S. Bessell*. **188**, 163, 11-E13
 2U 0900-40: A Black Hole? *D. T. Wickramasinghe, N. V. Vidal, M. S. Bessell, B. A. Peterson, and M. E. Perry*. **188**, 167, 11-F4
 Inverse Compton Radiation and the Magnetic Field in Clusters of Galaxies. *D. E. Harris and W. Romanishin*. **188**, 209, 13-A3
 X-Ray Emission from an Inward-propagating Shock in Young Supernova Remnants. *Christopher F. McKee*. **188**, 335, 14-B13
 The Synthesis of Close-Binary Light Curves. VI. X-Ray and Collapsar Binaries. *J. B. Hutchings*. **188**, 341, 14-C4
 Correlation Analysis of X-Ray Emission from Cygnus X-1. *A. C. Brinkman, D. R. Parsonsault, E. Schreier, H. Gursky, E. M. Kellogg, H. Tananbaum, and R. Giacconi*. **188**, 603, 17-E3
 The Third Uhuru Catalog of X-Ray Sources. *R. Giacconi, S. Murray, H. Gursky, E. Kellogg, E. Schreier, T. Matilsky, D. Koch, and H. Tananbaum*. **188**, 667, 18-B12; Suppl. 27, 37 (No. 237)
 Optical Spectra and the Mass of SMC X-1. *Patrick S. Osmer and W. A. Hiltner*. **188**, L5, 12-C5
- Upper Limit on 2.5-Second Pulsations from Hercules X-1. *Y. Avni, J. N. Bahcall, P. C. Joss, E. Schreier, H. Tananbaum, and D. Q. Lamb*. **188**, L35, 15-D6
 Soft X-Ray Variability of Binary X-Ray Stars. *James Buff and Richard McCray*. **188**, L37, 15-D7
 OSO-7 Observations of a High-Latitude X-Ray Source Associated with Abell Cluster A2052. *C. J. Heinz, G. W. Clark, W. H. G. Lewin, H. W. Schnopper, and G. F. Sprott*. **188**, L41, 15-D11
 The Bright Stars Associated with Galactic X-Ray Sources. *Sabatino Sofia*. **188**, L45, 15-D14
 The Peculiar Star He 2-177: A Slow Nova and a Possible X-Ray Source. *Eric D. Carlson and Karl G. Henize*. **188**, L47, 15-E2
 Detection of the [Fe xiv] Coronal Line at 5303 Å in the Cygnus Loop. *B. E. Woodgate, H. S. Stockman, Jr., J. R. P. Angel, and R. P. Kirshner*. **188**, L79, 18-C6
 On the Nature of the Unidentified High-Latitude Uhuru Sources. *S. S. Holt, E. A. Boldt, P. J. Serlemitsos, S. S. Murray, R. Giacconi, E. M. Kellogg, and T. A. Matilsky*. **188**, L97, 18-D8
 Accretion Flows in Galactic X-Ray Sources. I. Optically Thin Spherically Symmetric Model. *James Buff and Richard McCray*. **189**, 147, 20-D10
 The Nature of Cygnus X-3: A Prototype for Old-Population Binary X-Ray Sources. *Arthur Davidsen and Jeremiah P. Ostriker*. **189**, 331, 23-F1
 Long-Term Observations of Cygnus X-2 from OSO-7. *M. P. Ulmer, A. Sammuli, W. A. Baity, Wm. A. Wheaton, and L. E. Peterson*. **189**, 339, 23-F9
 An Investigation of Accretion of Matter onto White Dwarfs as a Possible X-Ray Mechanism. *A. J. DeGregoria*. **189**, 555, 26-E7
 Multiple Star Systems and X-Ray Sources. *J. N. Bahcall, F. J. Dyson, J. I. Katz, and E. Paczynski*. **189**, L17, 21-A1
 The Correlation of Radio Emission and Optical Type with X-Ray Emission from Clusters of Galaxies. *Frazer N. Owen*. **189**, L55, 24-D11
 Copernicus X-Ray Observations of NGC 1275 and the Core of the Perseus Cluster. *A. C. Fabian, J. C. Zarnecki, J. L. Culhane, F. J. Hawkins, A. Peacock, K. A. Pounds, and J. H. Parkinson*. **189**, L59, 24-E1
 An Unusual X-Ray Source in Scutum. *R. Hill, G. Burgin, R. Grader, A. Toor, J. Stoering, and F. Seward*. **189**, L69, 24-E9
 Observations of Hα in HDE 226868. *R. J. Brucato and R. R. Zappala*. **189**, L71, 24-E11
 Spectroscopic Observations of the Optical Companion to Centaurus X-3. *J. J. Rickard*. **189**, L113, 27-D1
 An Upper Limit on Soft X-Ray Pulsations from the Pulsar PSR 0833-45. *W. E. Moore, P. C. Agrawal, and G. Garmire*. **189**, L117, 27-D4
 Observation of X-Ray Emission from M31. *Stuart Bowyer, Bruce Margon, Michael Lampton, and Ray Crudeace*. **190**, 285, 31-D5
 The Effects of the 35-Day X-Ray Cycle on the Light Curve of HZ Herculis. *Steven A. Grandi, Paul M. N. O. Hintzen, Eric B. Jensen, Anthony E. Rydgren, John S. Scott, Philip M. Stickney, John A. J. Whelan, and Simon P. Worden*. **190**, 365, 32-C1
 The Extended X-Ray Source in Virgo and Its Relation to M87. *R. C. Catura, L. W. Acton, H. M. Johnson, and W. T. Zaumen*. **190**, 521, 35-B1
 Optical Observations of HD 77581 and a Model for the System HD 77581-2U 0900-40. *Larry D. Petro and W. A. Hiltner*. **190**, 661, 36-F7
 Optical Studies of Uhuru Sources. VIII. Observations of 92 Possible Counterparts of X-Ray Sources. *C. A. Jones, Timur Chekin, and W. Liller*. **190**, L1, 30-D4
 Detection of Soft X-Ray Emission from PSR 0833-45. *J. L. Culhane, A. M. Cruise, C. G. Rapley, and F. J. Hawkins*. **190**, L9, 30-D13
 Copernicus Observations of Variations in the X-Ray Flux from

- Cygnus X-1. *P. W. Sanford, K. O. Mason, F. J. Hawkins, P. Murdin, and A. Savage.* 190, L55, 33-F7
- Nonperiodic Optical Flickering in HZ Herculis. *T. J. Moffett, R. E. Nather, and P. A. Vanden Bout.* 190, L63, 33-G1
- The Absence of Radio Emission from HZ Herculis. *Lee Hartmann and Alan S. Lapedes.* 190, L67, 33-G5
- A New Measurement of the Hercules X-1 X-Ray Pulse Profile. *S. S. Holt, E. A. Boldt, R. E. Rothschild, J. L. R. Saba, and P. J. Serlemitsos.* 190, L109, 37-F7
- Limits on Rapid X-Ray Pulsing in X-Ray Binaries. *G. Spada, H. Bradt, R. Doxsey, A. Levine, and S. Rappaport.* 190, L113, 37-F10
- Optical Properties of HZ Herculis. *J. N. Bahcall, P. C. Joss, and Y. Avni.* 191, 211, 41-A11
- Short-Time Optical Variability of X-Ray Sources. *Y. Avni and J. N. Bahcall.* 191, 221, 41-B6
- A Model for the Transient X-Ray Sources. *H. M. Van Horn and C. J. Hansen.* 191, 479, 44-G4
- A Spectroscopic Analysis of HZ Herculis. *David Crampton and J. B. Hutchings.* 191, 483, 44-G7
- Color Variations of Scorpius X-1. *D. E. Mook, R. J. Messina, J. Pel, and W. A. Hiltner.* 191, 493, 45-A2
- 4.8-Second Pulsed X-Rays from Centaurus X-3 at Energy Greater than 7 keV. *M. P. Ulmer, W. A. Baity, Wm. A. Wheaton, and L. E. Peterson.* 191, 593, 46-A1
- Limit on X-Ray Emission from a Supernova during Maximum Light. *G. F. Sprott, H. V. Bradt, G. W. Clark, W. H. G. Lewin, H. W. Schnopper, L. Pigatto, and L. Rosino.* 191, 739, 48-C13
- $\text{H}\alpha$ Emission in Cygnus X-1. *J. B. Hutchings, A. P. Cowley, D. Crampton, G. Fahlmann, J. W. Glaspey, and G. A. H. Walker.* 191, 743, 48-D4
- Daily Observations of Cygnus X-3 at 10.5 GHz during the Period 1973 July–October. *V. A. Hughes, A. Woodsworth, P. C. Gregory, and E. R. Seaquist.* 191, 749, 48-D10
- Limits on Ionized Intracluster Gas in Abell 2199. *Arthur Davidsen and William Welch.* 191, L11, 42-A11
- Spectroscopic Studies of a Suggested Optical Candidate for Centaurus X-3. *N. V. Vidal, D. T. Wickramasinghe, B. A. Peterson, and M. S. Bessell.* 191, L23, 42-B11
- Apsidal Motion and Period Changes in Centaurus X-3. *H.-C. Thomas.* 191, L25, 42-B13
- Observation of an Absorption Dip in the X-Ray Intensity of Cygnus X-1. *Fuk Kwok Li and George W. Clark.* 191, L27, 42-C1
- X-Ray Observations of the Supernova Remnant IC 443. *P. Frank Winkler, Jr., and George W. Clark.* 191, L67, 46-B9
- Observations of Circinus X-1 from Uhuru. *C. Jones, R. Giacconi, W. Forman, and H. Tananbaum.* 191, L71, 46-B13
- OSO-7 Observations of Circinus X-1. *C. R. Canizares, F. K. Li, and G. W. Clark.* 191, L75, 46-C3
- Further Observations of Circularly Polarized Radiation from White Dwarfs and X-Ray Sources. *D. N. Brown, A. Rich, and W. L. Williams.* 191, L111, 49-A11
- X-Ray Observations of the Large Magellanic Cloud by the *Copernicus* Satellite. *C. G. Rapley and I. R. Tuohy.* 191, L113, 49-A13
- Optical Pulsations from the HZ Herculis–Hercules X-1 System. *Edward J. Groth.* 192, 517, 56-G6
- The X-Ray Spectra of the Vela and Puppis Supernova Remnants and the Shock-Wave Model of Supernova Remnants. *Paul Gorenstein, Frank R. Harnden, Jr., and Wallace H. Tucker.* 192, 661, 59-G4
- Analysis of the Blue Spectrum of the X-Ray Binary HD 153919. *J. B. Hutchings.* 192, 677, 60-A6
- The X-Ray Binary HD 77581. *J. B. Hutchings.* 192, 685, 60-A13
- Observations of the 4.8-Hour Variations of Cygnus X-3 above 7 keV from the OSO-7. *M. P. Ulmer, W. A. Baity, Wm. A. Wheaton, and L. E. Peterson.* 192, 691, 60-B4
- A Model for the Radio Bursts of Cygnus X-3. *K. A. Marsh, C. R. Purton, and P. A. Feldman.* 192, 697, 60-B9
- Upper Limits to Soft Gamma-Ray Flux from Seven X-Ray Sources and from the Galactic Plane. *V. Schönfelder and G. Lichti.* 192, L1, 53-A2
- X-Ray Absorption Events in Cygnus X-1 Observed with *Copernicus*. *Keith O. Mason, Frederick J. Hawkins, Peter W. Sanford, Paul Murdin, and Ann Savage.* 192, L65, 57-E13
- Optical Studies of *Uhuru* Sources. X. The Photometric History of He 2-177 (= 3U 1639-62?). *W. Liller.* 192, L89, 57-G6
- Infrared, Radio, and X-Ray Observations of Cygnus X-3. *E. E. Becklin, F. J. Hawkins, K. O. Mason, K. Matthews, G. Neugebauer, D. Packman, P. W. Sanford, B. Schupler, A. Stark, and C. G. Wynn-Williams.* 192, L119, 61-E11
- On Changes in the Pulsation Period of Hercules X-1. *Kenneth Brecher and Ira Wasserman.* 192, L125, 61-F7
- The Identification and *UBV* Photometry of the Visible Component of the Centaurus X-3 System. *W. Krzeminski.* 192, L135, 61-G2
- Mass Limits for the Centaurus X-3 System. *Y. Avni and J. N. Bahcall.* 192, L139, 61-G6
- X-Ray Emission from Vibrating White Dwarfs. *J. I. Katz and E. E. Salpeter.* 193, 429, 68-C12
- Optical Properties of X-Ray Clusters of Galaxies. *Neta A. Bahcall.* 193, 529, 70-C1
- Upper Limit to the X-Ray Flux from the Supernova in NGC 5253 above 7 keV from the OSO-7. *M. P. Ulmer, W. A. Baity, Wm. A. Wheaton, and L. E. Peterson.* 193, 535, 70-C6
- Optical and X-Ray Observations of 3U 0614+09. *Arthur Davidsen, Roger Malina, Harding Smith, Hyron Spinrad, Bruce Margon, Keith Mason, Frederick Hawkins, and Peter Sanford.* 193, L25, 66-B9
- Studies of Cluster X-Ray Sources: Size Measurements. *E. Kellogg and S. Murray.* 193, L57, 69-C3
- On the Light Curves and Masses of the X-Ray Sources Cygnus X-1, SMC X-1, and Centaurus X-3. *J. B. Hutchings.* 193, L61, 69-C7
- Upper Limits to Optical Pulsations from Centaurus X-3. *C. R. Canizares and J. E. McClintock.* 193, L65, 69-C10
- Uhuru* Observations of Short-Time-Scale Variations of the Crab. *R. Forman, R. Giacconi, C. Jones, E. Schreier, and H. Tananbaum.* 193, L67, 69-C12
- Parkes 0548-322: A BL Lacertae Object in a Cluster of Galaxies. *M. J. Disney.* 193, L103, 72-E11
- Numerical Study of X-Ray Induced Mass Transfer in the HZ Herculis–Hercules X-1 Binary System. *Marvin L. Alme and James R. Wilson.* 194, 147, 75-E1
- Time-dependent Accretion Disks around Compact Objects. II. Numerical Models and Instability of Inner Region. *Alan P. Lightman.* 194, 429, 79-C8
- High-Dispersion Spectroscopic Observations of HD 77581, a Candidate for Vela XR-1 (2U 0900–40). *George Wallerstein.* 194, 451, 79-D14
- Limitations on the Masses and Other Dimensions of the Binary HD 77581. *David R. Mikkelsen and George Wallerstein.* 194, 459, 79-E9
- The Nature of Cygnus X-3 Radio Outbursts from an Analysis of Radiofrequency Spectra. *P. C. Gregory and E. R. Seaquist.* 194, 715, 83-G1
- Some Problems with the Radio Source Cygnus X-3. *R. M. Hellming, R. L. Brown, and L. C. Blankenship.* 194, L13, 76-D1
- Relativistic-Particle Beam Instabilities and X-Ray Pulse Production by the Crab Pulsar. *Philip E. Hardee and William K. Rose.* 194, L35, 76-E9
- An Upper Limit to an X-Ray Point Source at the Center of the Cygnus Loop. *M. C. Weisskopf, H. Helava, and R. S. Wolff.* 194, L71, 80-E10
- A Search for Soft X-Ray Emission from Red-Giant Coronae. *Bruce Margon, Keith O. Mason, and Peter W. Sanford.* 194, L75, 80-F1
- Can the Constraint of Finite Mass Smooth Fluctuations in the

- X-Ray Sources — Continued**
- Background Radiation? *Daniel A. Schwartz*. **194**, L139, 84-E11
 - X-Rays**
 - Interstellar Absorption of X-Rays. *E. L. Fireman*. **187**, 57, 1-D13
 - On the Opacity of the Interstellar Medium to Ultrasoft X-Rays and Extreme-Ultraviolet Radiation. *Raymond Crudace, Francesco Paresce, Stuart Bowyer, and Michael Lampton*. **187**, 497, 7-F1
 - High-Energy X-Rays from the Perseus Cluster. *A. Bui-Van, K. Hurley, and G. Vedrenne*. **188**, 217, 13-A11
 - Multiple Inverse Compton Scattering and the Diffuse X-Ray Component. *A. Bui-Van and K. Hurley*. **188**, L51, 15-E6
 - Early Evolution of Radio Outbursts and a Possible Transient Emission of High-Energy Photons. *F. Pacini and M. Salvati*. **188**, L55, 15-E9
 - Statistical Time-dependent Model for the Interstellar Gas. *Humberto Gerola, Minas Kafatos, and Richard McCray*. **189**, 55, 19-E1
 - Accretion onto Black Holes: The Emergent Radiation Spectrum. III. Rotating (Kerr) Black Holes. *Stuart L. Shapiro*. **189**, 232, 23-F12
 - Observation of a Celestial Hard X-Ray Burst in Coincidence with a Gamma-Ray Burst. *G. G. C. Palumbo, G. Pizzichini, and G. R. Vespignani*. **189**, L9, 20-G8
 - Millisecond Temporal Structure in Cygnus X-1. *R. E. Rothschild, E. A. Boldt, S. S. Holt, and P. J. Serlemitsos*. **189**, L13, 20-G11
 - Large-Scale Effects of Supernova Remnants on the Galaxy: Generation and Maintenance of a Hot Network of Tunnels. *Donald P. Cox and Barham W. Smith*. **189**, L105, 27-C7
 - The Spectrum of Diffuse Cosmic X-Rays Observed by OSO-3 between 7 and 100 keV. *Daniel A. Schwartz and Laurence E. Peterson*. **190**, 297, 31-E3
 - Numerical Models for Supernova Remnants. V. *N. Mansfield and E. E. Salpeter*. **190**, 305, 31-E10
 - X-Ray Ionization Cross-Sections, and Ionization Equilibrium Equations Modified by Auger Transitions. *Jon C. Weisheit*. **190**, 735, 37-D7
 - Observations of Enhanced Soft X-Ray Emission from the Vicinity of the North Polar Spur. *P. A. J. de Korte, J. A. M. Bleeker, J. A. M. Deerenberg, Y. Tanaka, and K. Yamashita*. **190**, L5, 30-D7
 - Research with Solar Satellites. *Leo Goldberg*. **191**, 1, 39-A4
 - Ionization Mechanisms of the Intercloud Medium. *P. Mészáros*. **191**, 79, 39-G4
 - X-Ray Ionization and the Helium Abundance in 3C 120. *G. A. Shields*. **191**, 309, 43-B8
 - Spectrometric Properties of Crystals for X-Ray Astronomy. I. *A. J. Burek, D. M. Barrus, and R. L. Blake*. **191**, 533, 45-C13
 - A Search for a Cosmological Component of the Soft X-Ray Background in the Direction of M31. *Bruce Margon, Stuart Bowyer, Ray Crudace, Carl Heiles, Michael Lampton, and Thomas Troland*. **191**, L117, 49-B3
 - A Search for X-Rays from Supernova 1972e with Uhuru and OSO-7. *C. R. Canizares, J. E. Neighbours, and T. Matilsky*. **192**, L61, 57-E10
 - Search for Optical Emission from Cosmic Gamma-Ray Bursts. *J. E. Grindlay, E. L. Wright, and R. E. McCroskey*. **192**, L113, 61-E6
 - Remark on the Statistical Significance of Flares in Poisson Count Data. *William H. Press and Paul Schechter*. **193**, 437, 68-D6
 - X-Ray Morphology of the Perseus Cluster. *R. S. Wolff, H. Helava, T. Kifune, and M. C. Weisskopf*. **193**, L53, 69-B11
 - Observations of Features in the Soft X-Ray Background Flux. *F. O. Williamson, W. T. Sanders, W. L. Kraushaar, D. McCammon, R. Borken, and A. N. Bunner*. **193**, L133, 73-A1
 - X-Ray Structure of the Cygnus Loop. *S. Rappaport, R. Doxsey, A. Solinger, and R. Borken*. **194**, 329, 78-C3
 - Observation of a Cosmic Gamma-Ray Burst on Apollo 16. I. Temporal Variability and Energy Spectrum. *A. E. Metzger, R. H. Parker, D. Gilman, L. E. Peterson, and J. I. Trombka*. **194**, L19, 76-D9
 - Observation of a Cosmic Gamma-Ray Burst on Apollo 16. II. X-Ray Time Profile and Source Location. *J. I. Trombka, E. L. Eller, R. L. Schmadebeck, I. Adler, A. E. Metzger, D. Gilman, P. Gorenstein, and P. Bjorkholm*. **194**, L27, 76-E2
 - The Effect of Repeated Compton Scatterings on the Diffuse X-Ray Background. *James E. Felten and Robert J. Gould*. **194**, L38, 76-E12
 - X-Rays, Solar**
 - Relative Coronal Abundances Derived from X-Ray Observations. I. Sodium, Magnesium, Aluminum, Silicon, Sulfur, and Argon. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **188**, 423, 15-B9
 - Solar X-Ray Bright Points. *L. Golub, A. S. Krieger, J. K. Silk, A. F. Timothy, and G. S. Vaiana*. **189**, L93, 24-G5
 - Rise Time in 20–32 keV Impulsive X-Radiation. *Joan A. Vorpal and Tatsuo Takakura*. **191**, 563, 45-E13
 - Relative Coronal Abundances Derived from X-Ray Observations. II. Nitrogen, Oxygen, Neon, Magnesium, and Iron. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **192**, 169, 51-E5
 - Relative Coronal Abundances Derived from X-Ray Observations. III. The Effect of Cascades on the Relative Intensity of Fe XVII Line Fluxes, and a Revised Iron Abundance. *A. B. C. Walker, Jr., H. R. Rugge, and Kay Weiss*. **194**, 471, 79-F5
 - Zeeman Effect**
 - The Orientation of Magnetic Axes in Ap Stars: An Alternative Interpretation of the Component with Small Obliquity. *Ermanno F. Borra*. **187**, 271, 4-D13
 - Highly Excited States of Atoms in a Magnetic Field. *R. F. O'Connell*. **187**, 275, 4-E3
 - On the Interpretation of the Magnetic Curves of the Ap Stars as Determined by the Photographic Technique. *Ermanno F. Borra*. **188**, 287, 13-F9
 - Energy Spectrum of Hydrogen-like Atoms in a Strong Magnetic Field. *G. L. Surmelian and R. F. O'Connell*. **190**, 741, 37-D13
 - The Peculiar A Star HD 215441. *Saul J. Adelman*. **190**, 743, 37-E1; Suppl. **27**, 203 (No. 242)
 - Possible Evidence for a Large Magnetic Field in the Orion Infrared Nebula. *C. A. Beichman and E. J. Chaisson*. **190**, L21, 30-E11
 - The V1057 Cygni OH Source: Time Variation, Polarization Properties, and Accurate Position. *K. Y. Lo and Kenneth P. Bechtel*. **190**, L125, 37-G5
 - Magnetic Fields and Diffusion Processes in Peculiar A Stars. *Steven N. Shore and Saul J. Adelman*. **191**, 165, 40-E11
 - A Determination by the Zeeman Effect of the Magnetic Field Strength in the White Dwarf G99-37. *J. R. P. Angel and J. D. Landstreet*. **191**, 457, 44-E12
 - Magnetic Fields in the Orion Molecular Cloud from the Zeeman Effect in SO. *F. O. Clark and D. R. Johnson*. **191**, L87, 46-D1
 - Hydrogen and Helium Features in Magnetic White Dwarfs. *S. B. Kemic*. **193**, 213, 65-B2
 - Spectral Changes Induced by the Zeeman Effect in Oblique Rotator Models. *Ermanno F. Borra*. **193**, 699, 72-A1
 - Quadratic Zeeman Effect in the Hydrogen Balmer Lines from Magnetic White Dwarfs. *G. L. Surmelian and R. F. O'Connell*. **193**, 705, 72-A6
 - Discovery of a Magnetic DA White Dwarf. *J. R. P. Angel, R. F. Carswell, P. A. Strittmatter, E. A. Beaver, and R. Harms*. **194**, L47, 76-F6





